RAILROAD GAZETTE

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Colonel Prout.

[WITH A PORTRAIT.]

It is reasonable to expect that Colonel Prout's future years of activity will be even more productive than the past ones, for (*mens sana in sano corpore*) he has forgotten nothing and is healthy. It seems fitting now, as he ends 16 years of editorial work and returns to the practice of his profession,* to give to his readers some idea of his personality, and this to his schoolmate and life-long friend is a most attractive undertaking.

He belongs to the seventh generation in direct descent from Timothy Prout, who came from Biddeford, Devonshire, and landed in Boston in 1644. He likes to think that he is descended from Prowte, the Devonshire sailor who led the fire-ships into Calais Roads to drive out the ships of the Great Armada; but the line is rather fanciful. His New England ancestors were farmers, traders and sailors, and his great-grandfather, John Prout, was a sergeant in the Revolutionary army.

Henry Goslee Prout's early education was scanty and work was hard, and in the fall of 1863 he enlisted in a Massachusetts regiment, evidently thinking, with some reason, that war could have few terrors for a boy who had been bred on a New England hill farm. In the Army of the Potomac he went through the Wilderness campaign, the operations that led to the investment of Petersburg, the siege of Petersburg and the pursuit of Lee. In the summer of 1865 he was mustered out and in 1867 entered the University of Michigan, where he was graduated with the degree of Civil Engineer. He left college in the middle of his senior year to take a position as transitman and assistant engineer and only got his degree (*nunc pro tunc*) after his return from Africa. He paid part of the expenses of his college life by tutoring and other work, and also by two summers on the Survey of the Great Lakes, which gave him a geodetic training that was of great use later. He had a few years of work on railroad surveys and construction and two summers of surveys in the Rocky Mountains. In the second of these he commanded an expedition of reconnaissance in Southwestern Colorado, for the Engineer Bureau of the War Department, and ran an unbroken stadia line of 1,000 miles, crossing the main divide seven times.

The following autumn he entered the service of the Khédive of Egypt as a Major of Engineers. He remained in that service about four years and a half and before he resigned he reached the grade of Colonel in the General Staff. The first year of his service was in the Delta and on the Asiatic frontier. It covered geodetic and topographical engineering, studies for a hospital and a military prison and repairs of fortifications and the administration of the Engineer Bureau at the War Office. In all of this he had independent command, as was the case with all of his subsequent service. After the first year he went to the Soudan in command of an expedition to Kordofan and Darfour; and thence he was sent to the head of the Nile as Governor General of the Provinces of the Equator. This was at the request of General Gordon, whom Colonel Prout succeeded in that command when Gordon came down to Khartoum as Governor General of the Soudan. The Provinces of the Equator were put under the Soudan and thus Prout served under Gordon; but Lado, the capital of the Provinces, is 10½ deg. south of Khartoum, or 1,010 miles as the Nile logs, and communication was not frequent. The northern frontier of the Provinces was the tenth degree of latitude, and the southernmost station was in latitude 1½ deg. north, between the Victoria and the Albert Lakes. There is not space here to give details of this picturesque episode in Colonel Prout's life; but he had the confidence and respect of his superiors and the friendship of Gordon. General Stone, the Chief of Staff, writing officially of the Kordofan expedition says that it "evidences how much can be done by an able, instructed and honest-minded officer in those regions, when that officer thinks less of the risks and discomforts around him than of the accomplishment of duty for duty's sake." Gordon's opinion is shown by the fact that he had Prout promoted twice, and at the end recommended him for the rank of Pasha (a Colonel is a Bey) and offered him the Governorship of either of two Provinces if he would stay in the service.

One incident of this Soudan life is brought to mind by a cable despatch just received. When Prout marched across the desert from Suakim on the Red Sea to Berber on the Nile he was struck by the strategic and commercial value of that route for a railroad and made a careful reconnaissance and barometric profile, and in a report to the War Office he recommended that a railroad be built there. In the early years of the Mahdi's rebellion the British began a railroad from Suakim but soon gave it up. Now the cable tells us that Lord Cromer in a speech at Khartoum, announces the intention of the government to begin soon the building of a railroad from Suakim to the Nile. Had it been built within a few years after Prout's report Gordon would not have been besieged at Khartoum and the Soudan would not have been lost.

Prout's work in the Provinces of the Equator was chiefly administrative. He had 3,000 soldiers under him, scattered over a vast territory, and was (to quote Gordon's order) "supreme over finance, civil and military affairs." He had not a single American or European officer except Emin Effendi (later Emin Pasha), who had charge of medical service and stores. His most interesting engineering work was to carry an 80-ft. screw steamer about 60 miles, through the woods, over broken country and erect it at Dufli, whence it had clear navigation into the Albert Nyanza. There were no roads, no vehicles, and the only beasts of burden were naked savage negroes. The boiler was hauled on runners, but all the other parts were carried by men. It is not quite clear to Prout now how it happened that some essential part was not lost or destroyed. This was the steamer in which Emin went to meet Stanley at the time of the famous "rescue."

After his return to America he was for a little over a year signal engineer to the company out of which the Union Switch & Signal Co. grew. This was in the infancy of the art in America (although it was quite well grown in England) and the chance of a fair living in it was not very good. For a few years Prout was in business in the city of New York, and in March, 1887, he entered the service of the *Railroad Gazette* as the editor.

He knew that he was destined to make many errors of judgment in a field so new to him, but he chose at once to accept the full and undivided responsibility and succeed or fail, for he believed that only in that way could he maintain or increase the authority of the *Railroad Gazette*. At that time (1887) the publication was 31 years old and during this period but one change in chief editorship had occurred. For 20 years Mr. Dunning had been maintaining a reputation for painstaking accuracy and philosophical outlook, while his associate, Mr. Forney, ranking with the ablest rolling stock engineers in the world, aided in making it an authority. A change in editorship meant much more then, with few trained assistants, than it does now. Prout was properly diffident but of high courage, and capacity for hard work. He had, and has, great physical endurance. It seems amusing now, looking at his spare figure and scholarly face, to recall that he was nearly if not quite the best gymnast in the University. If championships had been known then as now he would surely have worn his college initial on his sweater.

Of the *Railroad Gazette* under Prout's editorship it is quite unnecessary to speak here, for those who read these lines know it. The least part of his work was his writing for it, although that would fill 15 or 20 sturdy volumes, the results of close study and careful application, for trained and critical readers. It is the editor's lot, and it is a pity, that his work is buried in his publication. He misses the personal monument of authorship. His chief work and his chief value in recent years has been his initiative, his suggestion and inspiration to his assistants, his watchfulness for errors, his criticism and correction of their work, both in form and in substance, and his frequent consultation, personally and through a large correspondence with the ablest railroad officers and engineers both in this country and in England.

Running along with his *Railroad Gazette* work has been a constant line of activities, more or less closely allied to his proper work, and these he cultivated partly as diversion and partly with the steady purpose of increasing his acquaintance and influence. He has always held that an editor, a teacher or a preacher must keep in close touch with men of business to do his best work. He has done a little consulting and expert work and been the friendly and confidential adviser of many railroad officers and engineers, young and old. He has given lectures in nearly all of the engineering schools from Boston to the Mississippi. He is now departmental editor for the railroad division of the new volumes of the Encyclopedia Britannica, and he has done a good deal of writing for the magazines and the daily press. Few editors of class journals have become more widely known personally, and in 1902 his work as an editor was recognized by Yale University in the honorary degree of Master of Arts. He has been a member of the American Society of Civil Engineers for many years, and has served that Society as a Director and on several special committees, and is now on the committee to consider the question of a revision of the standard rail sections. He is serving his third term as vice-president of the Engineers' Club of New York, and is one of the Governors. He is a member of the American Railway Engineering and Maintenance of Way Association, of the Master Car Builders' Association, of several Railroad Clubs, a Corresponding Member of the American Geographical Society and a member of the Century Club, of New York, being now on its Admissions Committee.

The bare record of his accomplishment is probably enough for those who know him, but to the thousands who have enjoyed his writings and have been aided by them it gives an insufficient idea of his personality. And yet, the literary quality of his work should give to a stranger an idea of his sturdy moral nature, of his intellectual integrity as well as of his intellectual activity. He earned and held and will always hold the respect, the affection and the good wishes of those intimately associated with him in the control of the *Railroad Gazette*. As a lecturer and as an after-dinner speaker, it is his simple dignity, as well as his graceful and clear expression, that compels attention to his serious purpose; for, even in an after-dinner atmosphere he always speaks, enlivened by real humor, with serious purpose.

The sum of it is that he is inspiring. He has such a fund of general and specific information, such a love of truth and thoroughness, such a scorn for lying and carelessness, such a ready quality of human sympathy, that, with a faculty for memory cultivated and quickened by editorial habit, he can subordinate himself and skilfully direct conversation so as to draw out others. His friend is apt to appear at his best when talking with Prout.

W. H. BOARDMAN.

*He goes to the Westinghouse Companies as Vice-President and General Manager of the Union Switch & Signal Company.

Another Source of Rail Wear.

TO THE EDITOR OF THE RAILROAD GAZETTE:

An editorial entitled "One Source of Rail Wear and Flange Wear" in the *Railroad Gazette* of December 19, touches a point of such vital interest both to motive power and track maintenance engineers that I take the liberty of addressing you with reference to a feature not touched by this editorial, but one which I know has had much thought from you. Doubtless much of the trouble is due to weak bolsters, but I believe you will agree with me that the vital point in the problem is a lack of uniformity in the resistance of the roadbed, which exists to such an astonishing degree on American railroads. Considerable attention has been given in late years to the perfecting of rail sections and increasing the weight of rails, while the much greater deficiency at the rail joints has been passed by as of not sufficient consequence to merit the serious attention of the higher railroad officials. In other words, a deficiency in the strength of the bolsters to the extent, it is hardly to be supposed, of over 20 per cent. under a freight car is likely to be noticed and remedied much quicker than a deficiency of fully 60 per cent. in the strength of the rail joint, which is the vital point in the attainment of a uniformly resisting roadbed.

The head of the maintenance department of one of our largest railroad systems said to me recently that weak rail joints are costing his company more than one million dollars a year. Isn't it astonishing that such a situation can exist and claim so little attention from those high enough in authority to remedy the deficiency?

Aggressive action has recently been taken by a few leading engineers with honest determination to find a solution to meet the requirements of modern traffic conditions satisfactorily, but only a select few are yet grappling consistently with the problem; it is to be hoped that they are to be the pioneers in a successful movement.

W. P. T.

The Kinsman Automatic Stop.

New York, Feb. 9, 1903.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The able and interesting editorial entitled "The Westfield Collision," in your journal Feb. 6, is the occasion of a few remarks which I trust you will find space for. Block signals have proved a very efficient factor of safety and have undoubtedly averted many terrible disasters. But, as is well known, they do not provide against the very important element of fallibility of the engineer. The point is very well illustrated in this sad disaster, and it is testified that the man in charge of the engine was an ideal engineer—young, of good physique and with a good record of 12 years' service as an engineer. As to placing an extra man in the cab, the sound logic of your editorial leaves little, if any, more to be said on this subject.

But, this human fallibility can be and has been provided against by the use of an automatic stop in conjunction with automatic block signals. I was gratified to read in your article that "The one tried . . . near Chi-

cago . . . possessed nearly or quite all of the elements of success for such a device," because it refers to the system invented and patented by me. Official records show that it is not only "feasible" from the "mechanic's" standpoint, but eminently practical from any standpoint; and the system had numerous opportunities to show its value in regular service. Since the trial in question there have been further improvements. "Triggers" are not used. They were long ago proved impracticable except under very favorable conditions, as in the case of the Boston Elevated, where the "triggers" are not apt to be interfered with by sleet, ice, snow, ballast or individual curiosity, and where all cars have practically the same clearances. In my system, electrical contact is made by means of a shoe or wheel and a rail spiked to the ties for either short distances or the entire length of the road, as the road may desire.

As to whether or not it is harder to enforce human vigilance where an automatic stop is used on account of the engineman depending on the automatic operation of the stop: generally speaking the objection is well taken; but, with my system it has no force. The recording apparatus makes two kinds of records. The record made when the stop operates automatically by the engine passing a danger signal is entirely different from that made by passing a signal set for safety; and as the guarding points are just at or a little beyond the home signal, no engineman would be willing to risk an explanation by running past signals he ought not, for, when he turns in the record of his run his superiors can immediately see whether or not the apparatus was allowed to go into automatic action without due cause. Each engine that passes over the road acts as an automatic inspector of block signals, and the records at the end of each run will show whether or not each semaphore has acted properly.

The cost of installing my automatic stop is not excessive, the action is positive, and I repeat that when used in conjunction with visual block signals the element of human fallibility on the part of the engineer is provided for.

F. E. KINSMAN, *Member A. I. E. E.*

Thirteen.

Toronto, Jan. 31, 1903.

To the Editor of The Railroad Gazette:

One of our Canadian railroads is a confederation of 13 corporations. It has 13 directors or vice-presidents. It has 13 heads of departments. It has 13 hundred miles of main lines, and 13 thousand men are on its pay rolls. Just lately it has made a record of 13 collisions in 13 weeks. Is there not some kind of a popular prejudice or superstition in regard to the "baker's dozen?" C. B.

The Friction Draft-Gear Problem.*

BY R. A. PARKE.

A few years ago the standard freight car weighed about 25,000 lbs., and carried a load of 40,000 lbs. It has been succeeded by cars weighing from 30,000 to 33,000 lbs., bearing a load of 100,000 lbs., so that the loaded cars of to-day weigh fully 100 per cent. more than those of a few years since. Simultaneously with this change, switching locomotives have been increased in weight and capacity to handle these heavy cars in large numbers. The link and pin coupler has been replaced by the automatic, whereby men are not required to go between cars to couple them, and the practice of bringing cars together with considerable force to insure coupling, which is claimed alike by yardmen and engineers to be necessary, is indulged in without reserve. At the same time, railroad transportation has undergone enormous expansion, and yardmen assert that, in working as rapidly as they are required, in order to keep the freight moving, it is impossible to exercise as much care as formerly in bringing cars together. . . .

The work of impact, which must be absorbed by draft-gear or be permitted to distort and crush the materials of which the car is constructed, up to the instant of maximum pressure, when the two cars move at a uniform speed, is about 2,450 ft. lbs. for loaded cars weighing 65,000 lbs., when the speed of meeting is one and one-half miles per hour; but, when the loaded weight is increased to 130,000 lbs., and the speed of coming together is increased to three and one-half miles per hour, the same work of impact is increased to about 26,630 ft. lbs. —nearly 11 times the former amount. The spring draft-gear employed upon the former class of freight cars was generally capable of one and three-quarter inches motion, with a final spring pressure of, at most, 20,000 lbs., and usually somewhat less, and therefore had the capacity of absorbing about 2,900 ft. lbs. of mechanical energy in avoiding direct impact between the car structures. It was quite well adapted to meet the demand upon draft-gear for the impact of former practice; but it has less than one-ninth the capacity required in the present practice. . . .

Impact with spring draft-gears is elastic impact, and, regardless of the conditions existing in making up trains in yards, etc., there are road conditions that simply prohibit elastic impact. It is a very well known fact that an emergency application of the air-brake progresses, by means of an impulse of reduced air pressure, propagated throughout the length of the train pipe of a long freight train, with nearly the rapidity with which sound travels through the same distance; but the application of the retarding force of the brakes is, in consequence, a serial operation, which causes the forward portion of the train to become retarded sufficiently in advance of the rear portion to bunch the train and solidly close draft springs many times stronger than any ever used. When the rear cars subsequently receive the full retarding effect of the brakes, at the ordinary freight-train speeds of 25 or 30 miles per hour, the release of the mechanical energy stored by even the ordinary draft spring, almost inevitably results in parting an empty train of any considerable length, in one or more places, and frequently loaded trains also. It is safe to say that draft springs of anything like sufficient strength to absorb the mechanical energy regularly disposed of by friction draft gears, would cause long trains of either empty or loaded cars to be parted in every emergency application of the brakes at the customary freight-train speeds.

In addition to the emergency application of the air-brake, other conditions of regular service, also, such as those of passing through "sags" and over "hog backs," result in tensile strains upon the draft-gear that far exceed ordinary belief and cause many train partings that are generally credited to the rough or careless handling of the engineer. . . . The committee appointed by the Western Railway Club to consider this subject, after an extended series of tests, both in the yard and upon the road, with a dynamometer car designed and constructed for the purpose, made the following statements in their report to the club:

"From the general results of the tests, it is believed that the tensile strains in draft-gears, with careful handling, will frequently reach 50,000 lbs., with ordinary handling, and, with decidedly rough handling, fully 100,000 lbs., while the buffing strains can be placed at 100,000, 150,000 and from 200,000 to 300,000 lbs., respectively."

In referring to the effect which is caused largely by the compounding of vibrations, it is stated: "This is well illustrated in test No. 54, in which the train broke in two, and yet the greatest tensile strain recorded during the trip was 50,266 lbs., and this did not occur at the moment of breaking in two.

"There is one fact standing out prominently in the results of these tests, which is that the most ordinary movement in coupling up engines and cars, even if performed with care, results in heavy buffing shocks.

"We think the figures show the necessity of something better and more effective than the spring draft-gear so commonly used. . . . Whatever one may think of the details of the various friction draft-gears, it must be evident that, in character and amount of resistance, they are superior to the spring draft-gears."

It will hardly be disputed, therefore, that the assumption that the draft-gear question has narrowed down to the "friction draft-gear question" is justified. There are various arrangements of spring draft-gears, but none of them provides more than a fractional part of the resistance, to either tension or compression, that is necessary. . . . What mechanical means are left for choice in selecting a suitable yielding resistance in draft-gear? Compressed air has been variously proposed and tried; but, even if it provide sufficient resistance with a device of satisfactorily limited proportions, its elasticity is equal if not superior to that of the spring, and that alone excludes it from further consideration. There remain, then, apparently only hydraulic and frictional resistances, both of which might, indeed, be included in the single class of frictional resistances, as it must be the frictional resistance to the flow of the liquid that constitutes the essential feature of the hydraulic draft-gear. Too little has yet developed in the practical application of the hydraulic draft-gear to permit the formulation of definite conclusions concerning its possible utility; but, overlooking other questions of apparently serious difficulty, the single one of maintaining a suitable liquid, in requisite quantity and uniform operative condition, upon the various kinds of freight cars, under all the many different conditions of practical service, is sufficiently unattractive to explain the comparatively small consideration that this type of draft-gear has thus far received.

The problem seems thus to have narrowed down to the title chosen for this paper—the "friction draft-gear problem." . . . It need hardly be said that a first requisite of a good friction draft-gear is that it should not be liable to disorder or repair. The parts should be simply and substantially designed, easily inspected and incapable of being improperly assembled. It should be securely housed, and be of such construction and form that if may be firmly fastened to the car frame.

The first measure of efficiency of a draft-gear is the mean resistance offered to either tension or compression through the greatest allowable movement. It is not alone the maximum resistance that indicates efficiency in draft-gear; one in which the resistance increases rapidly at an early period of the movement may be much more efficient than one in which the final resistance is considerably greater, but in which it is comparatively low until toward the end of the movement, when it rises with great rapidity. Some draft-gears appear to have been designed to utilize only a portion of the friction-producing mechanism during the major part of the movement, and only after that to bring the mechanism of greater resistance into operation. The efficiency is measured by the work absorbed, which is the product of the *mean* resistance and the length of movement. The earlier the attainment of a high resistance, the greater the mean resistance, and therefore the greater the efficiency will be, and thus a high resistance should be acquired as early in the movement as is consistent with other functions to be performed.

The second, and not less important, measure of efficiency is the approach to absence of reaction during release, while the moving parts of the draft-gear are returning to their normal positions, after having been in action; or, in other words, the comparative freedom from recoil such as accompanies the release of a compressed spring. . . .

The question as to the maximum capacity of friction draft-gear does not appear to have yet been authoritatively formulated or considered, and the view taken of the matter, in determining the capacity of the Westinghouse friction draft-gear, may therefore be of interest. It was determined [by experiments described by Mr. Parke] that a draft-gear having a final maximum resistance of 150,000 lbs. will prevent the solid impact that causes couplers to be broken, under any of the practical conditions of railroad service; and that was made the standard requirement of the Westinghouse friction draft-gears sent out into service.

An essential feature of the operation of friction draft-gear is the release, or restoration of the parts to their normal positions, after action. The draft-gear must operate in either direction, and the parts must normally be in a position of readiness to respond to every operative requirement. . . . The inelastic frictional resistance chiefly employed to absorb the work of impact is instituted by a comparatively small spring resistance, which, being elastic, is utilized to restore the parts to their normal positions. No feature of the friction draft-gear is more attractive than the simplicity with which this spring fulfils the requirements of a theoretically perfect draft-gear. While its employment introduces an elastic (and therefore generally objectionable) resistance, it may be so proportioned that the work restored by it is absorbed by the resistance of the draft-gear mechanism alone, during release, without recoil upon the adjoining car. . . .

While the draft-gear must be constructed with a view of attaining the maximum efficiency in those operations requiring high resistance, provision must also be made for a moderate resistance during the comparatively short movements that are constantly occurring while the train is in motion. This may be accomplished by the provision of special frictional apparatus for these small movements, or by the use of a spring or other yielding resistance. A spring is the most simple and convenient mechanism for this purpose, and it is therefore so employed that it alone operates in all the small movements of constant occurrence between the cars of moving trains. It is also so employed, in conjunction with other provisions, that it serves the highly useful purpose of greatly increasing the frictional resistance to impact as the movement of the parts increases.

These are the important functions of the "preliminary spring" of the friction draft-gear, and the necessity of providing for them will answer the question so often asked, why a spring or springs should be used in friction draft-gear, if springs are not suitable to absorb the work of impact, for which draft-gear is chiefly designed. The springs used in friction draft-gear play an important part in the major operations, without introducing objectionable recoil, and the preliminary spring plays an indispensable part in the performance of other functions, the neglect of which must prove a most serious if not fatal defect in any draft-gear organization.

It will be evident, upon consideration of the matters which have thus been briefly outlined, that a friction draft-gear adapted to satisfactorily fulfil the complicated demands is a difficult problem. It involves the exacting requirements of a yielding resistance of such character and enormous degree that couplers cannot be broken or trains parted, either by direct tensile strain or by recoil from compressive strain, under any conditions of practical service, together with a positive and certain release and perpetual readiness for operation, in addition to which it must present the most favorable conditions for facilitating the starting of long trains, and must endure the ceaseless motion between the cars of moving trains without objectionable wear; and yet the mechanism must be simple and durable, requiring neither repair nor attention. These complicated requirements were not all apparent in the beginning, but have gradually developed through years of patient experiment and study, which has more than once appeared to be unavailing and discouraging; and only persistent conviction of the absolute necessity of a satisfactory solution of the problem has supplied the courage and maintained the interest which have brought the friction draft-gear up to its present stage of practical utility.

*Extracts from a paper read before the New England Railroad Club, February 10, 1903.

Dividend Prospects of English Railroads.

From earnings for the six months ending Dec. 31, 1902, the London & South-Western has declared a dividend at the rate of 8 per cent. and 2 per cent. per annum on the original and deferred converted stocks, respectively, as compared with a 7¼ and 1⅜ rate for the corresponding half year of 1901. The balance carried forward is £6,000 more than in the previous six months. The Great Eastern will pay the same dividend as before, 4¾ per cent., but will carry forward £78,000 instead of £60,000. This result is most creditable, as the weather of the past summer has been so uncertain as to reduce the seaside travel very much, indeed. The train mileage decreased almost 145,000 train miles, but the revenue increased (net) £52,000. The London, Brighton & South Coast has placed an unusually large amount to the credit of renewals in rolling stock and is in the position of having a gross increase of about £60,000 for the past six months. This allows of a dividend at the rate of 5⅜ per cent. on the ordinary stock and a surplus of about £29,000. The traf-

fic has increased very rapidly on this line and the need for increased rolling stock has been acutely felt, although additional engines have been provided. The South-Eastern part of the amalgamated lines has a slightly less amount available for dividends, owing to the unexpected falling in of the tunnel at Chislehurst, which caused serious interruption of traffic in the summer.

Power Required to Drive Machine Tools—Buffalo, Rochester & Pittsburgh Shops, Du Bois, Pa.

The following tests were made for the purpose of ascertaining the amount of power used by various machine tools when operating in regular routine work, and at the same time the power lost in shafting and belting in a group-driven system.

If all the machines in a group were thrown on and driven at their highest capacity at one time, they would, in most cases, probably require an amount of power approximating the capacity of the motors. However, in the conditions of actual daily operation this never happens. Some of the tools are always either idle or working lightly, and the amount of power demanded hardly ever reaches half of the possible maximum total. The load factor is the ratio of the average power to the maximum.

Before proceeding with the results of the tests a brief description of the shops may be of interest. The plant consists of five buildings, viz.: the power house, the locomotive erecting, boiler and machine shops, the roundhouse, the blacksmith shop and the storehouse and offices. These buildings are on a plat of ground of 32 acres and the equipment is intended to handle the repairs of about 150 locomotives a year, with provision for an increase of 75 engines, which is expected to cover about five years, making an estimated ultimate total of 17 engines per month. The machine, boiler and tank shops are under one roof, covering an area of 134 x 524 ft. The blacksmith shop is 80 x 140 ft.; the power house, 63 x 93 ft.; the office and storehouse, 60 x 120 ft.; and in addition to these there is an oilhouse, 30 x 60 ft.; a 16-stall roundhouse, and a 26 x 140 ft. coal, coke and iron storage building.

The storehouse contains general storeroom facilities on the first floor, and offices, draughting room, etc., on the second floor.

The power plant, which, as above stated, is in a separate building, is designed for the transmission of power by electricity and compressed air, and furnishes all power needed for driving the machinery, lighting the shops, grounds, a large car building plant and neighboring stations, and the further supply of steam for heating the buildings. All pipes and wires pass from the power house to the several buildings through underground galleries. The boiler equipment comprises four 200-h.p. water-tube boilers, the furnaces of which are hand fired. The engine room contains the following machinery:

A Westinghouse 200-h.p., compound engine, direct connected to a Westinghouse, 125-k.w., d.c., e.t., compound-wound generator, operating at 250 volts and 280 r.p.m. This generator carries the day load and supplies power for machine tools, cranes, lighting, etc.

A Westinghouse, 100-h.p., simple engine, belt connected to a Westinghouse, 75-k.w., d.c., compound-wound generator, operating at 250 volts and 750 r.p.m. This generator carries the night load and supplies power for lighting, motor driving for special night work and the turntable. The night and day load generators are interchangeable at the switchboard.

A Westinghouse, 100-h.p., simple engine, belt connected to a Westinghouse, 60-k.w., two-phase, a.c. generator, operating at 2,200 volts, 7,200 alternations and 900 r.p.m. This generator furnishes power for lighting the yards, the Falls Creek station, the passenger and freight stations at Du Bois and the Du Bois car shops.

A Westinghouse, 2½-h.p. exciter, operating at 125 volts and 180 r.p.m.

A standard marble switchboard.

An Ingersoll-Sergeant, steam-driven compressor, furnishing compressed air for the plant.

The results of the tests are given below, the net power consumed by each tool or group of tools being stated. It is to be noted in reading these results that the net power consumed by the several tools and by the line shafting was not obtained directly, but by subtraction. All measurements were made by means of a volt meter and an ammeter in the motor circuit. These indicated the electrical horse-power delivered to the motor. The brake horse-power delivered by the motor at any given load was then determined by means of the motor efficiency curve. This is a source of considerable error at low readings, since the actual efficiency of the motor as installed may differ from that given on the curve sheet.

The amount of power consumed by the shafts and belts being known, and then the amount consumed with the tool running being taken, the first quantity was subtracted from the latter, to give the amount actually consumed by the tool. This probably gave very nearly the correct results, since the energy lost in shafting and belting is very nearly constant at various loads. The tests were made while the shops were in full daily operation, and it was for that reason impossible in many cases to make as direct measurements as might seem desirable. In order, therefore, to present the actual conditions of each test the log has been given below in full as recorded, except that all readings are translated into brake horse-power delivered at the tool. In explanation of the small loads allotted to some of the motors, it should be stated that when they were selected provision was made for the probable increase in the capacity of the shop. Experiments are also being conducted with high-speed cutting steels, which, if adopted, will considerably increase the demands for power.

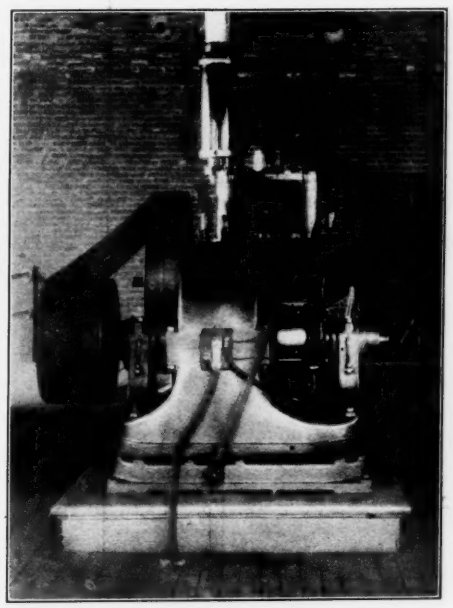
These tests, in addition to furnishing accurate data relating to the power required for various tools when starting, running light and cutting, also make possible some estimate of the merits of roller bearings for shaft hangers. The line shafts are cold-rolled steel and are carried on Hyatt roller bearings, and a shaft 200 ft. long without belts could be turned by hand. But in spite of the unusual efficiency of the bearings it will be noted that the power consumed by the tool is often less than that lost in transmission. Nevertheless, the capacity in motors required for the group drive is 2 to 2½ times smaller than it would have been had each tool been provided with an individual motor. It is a question as to how far the low average power taken by large groups of tools in operation may be due to the flywheel action of the shafts and pulleys.

The locomotive shop consists of a middle aisle for erecting and two shed bays equipped with shafting for driving the machine tools. Two 50-ton, electric traveling cranes have a runway in the middle aisle. There are five lines of shafting, driven by five shunt motors in the shed bays, and the sections are designated as wheel section and boiler section in one bay, and lathe, tool and flue sections in the opposite bays.

Wheel Section.—Shafting driven by a 40 h.p., shunt-wound motor and operates a 42-in. car wheel boring mill, 48-in. car wheel lathe, two 79-in. wheel lathes, quartering machine, 60 x 60 x 18 in. planer, 84-in. boring mill, single axle lathe, 6-ft. radial drill, 18-in. slotter, band saw, No. 7 grinder, and water tool grinder.

The line shaft is 200 ft. long, 2½ in. in diameter, and has 26 hangers. It was inconvenient in this instance to obtain a test of the line shaft alone. A test of the line shaft and counters only gave 1.5 h.p.

A 15-minute test was made of a group of machines comprising a 72-in. and a 66-in. wheel lathe, each with two cuts, a wheel press operated at 50 tons and an 84-in. Niles boring mill, a band saw belt, an emery wheel, a Pond radial drill and a 60-in. planer, with one tool cutting cast iron, with an average result of 4.6 h.p., a minimum of .88 h.p. and a maximum of 10.43 h.p. The speed of the line shaft was 160 r.p.m.



One of the Power Units—Buffalo, Rochester & Pittsburgh Shops.

Two machines were then thrown in, a 42-in. wheel lathe cutting with one tool and an 84-in. boring mill, with the wheel lathe cutting. The boring mill starting up took 6.9 h.p. To the above two machines were added, a tool grinder and a 79-in. wheel lathe cutting, which starting up took 6.3 h. p., and running steadily 3.95 h.p. To the above was added a 60-in. planer, cutting a cast-iron cylinder, which at starting took 10.3 h. p. and running steadily 4.2 to 7 h.p., or an average of 6.1 h.p. To the above were added another tool grinder and an 18-in. slotter. The maximum reversals of the planer and the slotter at the same instant gave 15.5 h.p. and steady running showed 5.2 h.p. The planer interfered somewhat with the readings. To the above was added a band saw, cutting 4-in. oak, which took 5.6 h.p. Whether the saw was cutting or not seemed to make no difference in the reading.

Tests of single machines were then made; that is, of the power consumed by the one machine tool thrown in at a time. A 42-in. wheel lathe with one tool cutting took on starting up 4.6 h.p. and on steady running .5 h.p. An emery wheel took .7 h.p. A 79-in. wheel lathe with two tools making roughing cuts on a pair of drivers took 4 h.p. An 84-in. boring mill boring an 8-in. cylinder took 2 h.p. A 60-in. planer cutting a cast-iron cylinder took 2 h.p., and a maximum at reversal of 8.5 h.p. An 18-in. slotter with tools of ¾-in. face, cutting steel, took .3 h.p. and a maximum at reversal of 1.2 h.p. A band saw starting up took 6.3 h.p. and running light or cutting 4-in. oak 4 h.p.

A group run of an 84-in. boring mill, a 79-in. wheel lathe, a 6-ft. radial drill, a 60-in. planer and an 18-in. slotter gave at steady running 6.9 h.p., and with the planer at reversal took 14 h.p.

Boiler Section.—Shafting driven by a 30-h.p., shunt-wound motor and operating 12-ft. bending rolls, bolt cutter, stay-bolt cutter, drill press, tool grinder, Brooks plate planer, horizontal punch, shear and punch, 6-ft. bending rolls, 6-ft. straightening rolls, 6-ft. radial drill.

All the counter belts were thrown off and the line shaft tested alone, with a result of .3 h.p. This line shaft is 170 ft. long, 2½ in. in diameter and has 19 hangers. The speed of the line shaft was 158 r.p.m. A test of the line shaft and countershafts, only, gave an average of 2 h.p.

The machines comprising the first group tested were: A stay-bolt cutter and a bolt cutter, a No. 4 Hilles & Jones punch and shear. The No. 4 punch and shear was punching $^{13}/_{32}$-in. holes in $^{3}/_{16}$-in. steel plate. A 15-minute test showed an average of 1 h.p., with a minimum of 2 h.p. and a maximum of 3.5 h.p.

A single tool, the No. 4 Hilles & Jones 48-in. punch and shear, was then thrown in, and starting up light took 6.9 h.p., settling down to .4 h.p. Shearing $^{5}/_{16}$-in. steel plate it required 3 h.p. A 6-ft. radial drill was then added and at starting up light took 3.6 h.p., settling down to 1.1 h.p. A 1½-in. drill cutting in steel gave 1.5 h.p. A 6-ft. radial drill and bolt cutter required 1.1 h.p. The 12-ft. rolls were then added and starting up light showed 7.3 h.p., settling down to 4.75 h.p. Rolling steel plates ½ x 8 in. required 5.3 h.p.

A test of line shaft and counters with the 6-ft. radial drill cutting steel with 1½-in. drill and a punch and shear running light showed 2 h.p. A 1-in. stay-bolt cutter added to the above took on starting up 4.5 h.p., and cutting 12 threads per inch gave 2.1 h.p.

Lathe Section.—Shafting driven by a 30-h.p., shunt-wound motor and operating 24-in. crank planer, 36-in. x 36-in. x 20 ft. planer, 51-in. boring mill, 16-in. shaping machine, 24-in. lathe, 24-in. drill press, 37-in. boring mill, two 22-in. lathes, three 16-in. lathes, two 18-in. lathes, 28-in. lathe, 43-in. lathe, 2 x 24 in. flat turret lathe, two 26-in. x 26-in. x 10 ft. planers, 60-in. horizontal boring machine, water tool grinder and a centering machine.

The line shaft and counters gave 4.1 h.p. A test of the line shaft with counterbelts off gave .7 h.p. The speed of the line shaft was 155 r.p.m. The line shaft is 180 ft. long, 2½ in. in diameter, and has 22 hangers.

A 15-minute test was made of a group of machines comprising two 26-in. planers and one 36-in. planer, cutting steel with one tool each, a turret lathe, an emery wheel, three 16-in. lathes, two 22-in. lathes, a 36-in. boring mill, drill press and a shaper, all in operation. The readings gave an average result of 6.9 h.p., a minimum of 4.74 h.p. and a maximum of 15 h.p.

A group run of a 26-in. planer, three 16-in. lathes, an 18-in. lathe, a 24-in. lathe, a 16-in. shaper, a 24-in. drill press, and a centering machine in operation required at steady running 2.4 h.p. and at reversal of the planer 7.6 h.p. A single 26-in. planer cutting cast iron took 1 h.p. and at reversal 3.5 h.p. A 16-in. shaper cutting $^{1}/_{32}$-in. steel at 12-in. stroke took .9 h.p., with a minimum of .2 h.p. and a maximum of 1.4 h.p. A 24-in. turret lathe cutting required .3 h.p. A 24-in. lathe boring brass took .03 h.p.

Tool Section.—Shafting driven by a 20-h.p., shunt-wound motor and operating tool grinder, drill grinder, 21-in. drill press, 16-in. lathe, milling machine, grinding machine, three 18-in. turret lathes, 24-in. drill press, 28-in. lathe, No. 10 vertical milling machine, 2 spindle rod drills, 14-in. pillar shaper, 16-in. lathe, 26-in. x 26-in. x 6 ft. planer, 32-in. drill press, surface grinding machine, water tool grinder.

The line shaft and counters required 2.8 h.p. The line shaft is 140 ft. long, 2½ in. in diameter, and has 20 hangers. It was not convenient to obtain a test of the line shaft alone. The speed of the line shaft was 155 r.p.m. The line shafts of the lathe and tool sections can be connected by a clutch coupling and the whole operated from either motor.

A group test was made of a 16-in. lathe, a drill press and a grinder, all in operation, with a result of 1.9 h.p. A single grinder took in starting up 9.7 h.p. and grinding 1.95 h.p. A 28-in. lathe took on starting 4.7 h.p. and cutting steel 2.5 h.p. A group run of two 16-in. lathes, a shaper and two grinders in operation showed 2.5 h.p.

Flue Section.—Shafting driven by 10-h.p., shunt-wound motor and operating flue welder, flue cleaner, two No. 7 Jarecki pipe-threading machines, two pipe cutters.

A test of the line shaft with all counters gave .6 h.p. A test of the line shaft gave .035 h.p. The line shaft is 90 ft. long, 2½ in. in diameter, and has 12 hangers.

A single flue welder with blowing fan attached required on starting up 7.1 h.p. Running light it took 3.4 h.p. The pipe cutter cutting 2½-in. pipe took .06 h.p. The auto-flue cleaner, cleaning 2-in. flue, took .2 h.p.

Flue Rattler.—Outside at the end of the machine shop is a flue rattler operated by a 7½-h.p. shunt-wound motor.

Blacksmith Shop.—The blacksmith shop is driven by a 40-h.p. shunt-wound motor, which is belted to 75 ft. of 2½-in. line shafting, with 12 hangers. The apparatus driven comprises a bolt-header, a 25-in. punch and shear, a cutting-off saw, a tool grinder, a 40-in. planer, a drill press, a 50-lb. hammer, a blower and an exhaust fan.

A test of the line shaft and counters with grindstone and two blowers constantly in operation gave 14.5 h.p.

The bolt-header, added to the above, gave on starting 7.8 h.p., running light .5 h.p. and heading 1-in. bolts 3.5 h.p.

A No. 2 Hilles & Jones punch and shear added to the above, first condition, gave on starting up 5.5 h.p., running light .5 h.p. and shearing 1½-in. round bar 4.3 h.p.

Turntable.—The turntable is 70 ft. long and is operated by a 10-h.p. d.c. motor of the street railroad type geared to an independent traction wheel, the driving combination being supported in a pivoted frame, or "donkey," which rests with all its weight upon the turntable track, even

when the table is tipped by a locomotive. The power is led to the motor through a sliding contact placed on the bridge above the center of the turntable.

With the table running light and the controller on full a test gave 4.45 h.p. In throwing on the controller and accelerating up to full speed 5 h.p. was attained, which dropped to a constant of 4.45 h.p.

With a Class S-2 locomotive on the table, weighing with tender approximately 286,000 lbs., a test gave 7.35 h.p. when accelerating to full speed. When full speed was attained the test showed 5.43 h.p.

Power House.—Switchboard readings of the ammeter and volt-meter were taken every five minutes from 1 p. m. to 5:30 p. m., with averages of 220 volts and 250.7 amperes, or 73.8 h.p. The minimum current was 200 amperes, or 59 h.p., and maximum current 300 amperes, or 88.5 h.p., the average of which is 250 amperes, or 73.75 h.p.

These tests were carried out by Messrs. H. M. Palmer and George H. Gibson, of the Westinghouse Electric & Manufacturing Company, and were made possible by the courtesy and permission of Mr. F. T. Hyndman, Master Mechanic, and the kind assistance of Mr. C. D. McArthur, Chief Draftsman of the Buffalo, Rochester & Pittsburgh Railway Company.

The Improved Barschall Rail Joint.

The reader will remember that a few years ago the Barschall joint was put down on the Pennsylvania Lines on quite a stretch of track. The principal criticism made against this joint is that wheels with false flanges strike the auxiliary rail with a shock and that the tread of the wheel is lifted clear of the head of the running rail by the bearing of the false flange on the auxiliary rail. This condition is shown in Fig. 1, which shows the auxiliary rail made by planing down an ordinary rail. Mr. Barschall has improved the joint by using a special rolled rail for the auxiliary and the relations of this to the false flange are shown in Fig. 2.

Fig. 3 shows sections of rolled joints and of the wheel tires, supposed to be in their relative positions, but to save space we have drawn the two sections together and the gage between rails is not represented in the figure. It will be seen that even with the flange a little worn and in close contact with the rail head the false flange

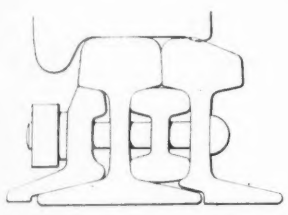


Fig. 1.

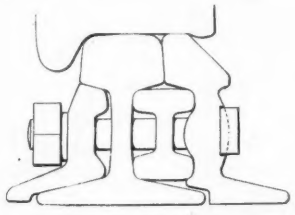


Fig. 2.

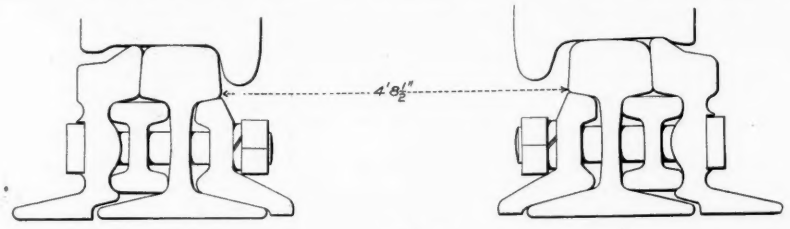


Fig. 3.

still clears the bearing surface of the auxiliary rail. This improvement pretty well does away with the objection which we have mentioned. The rolled joint comes up closer to the head of the main rail than the planed joint as it has been used, and it also has a broader bearing for the wheel tread than the planed joint.

Mr. Barschall informs us that this improved rolled joint is giving good satisfaction in considerable use in Europe. It shows even wear throughout and the wheels take the joints without shock. This joint is in use on 75 kilometers of the Vienna State Railroad. The rolled joints were put in track there in 1896. Up to May, 1902, more than 30.4 million tons of express, passenger and freight traffic had passed over these joints. The joint has been used for quite a number of years on the Kashan Oderberger Railroad on 35 kilometers. This road also has a heavy express, passenger and freight traffic, and after the long trials the joint was adopted there as standard. It was also put in on the Grand Ducal Railroad of Schwerin, in old track with battered ends. Here 25 kilometers was laid with the Barschall rolled joint, and several years of life were added to rails which would otherwise have been rejected because of the bad state of the ends. The cost of maintenance there has been materially reduced.

In times past we have published descriptions (May 4, 1900, p. 284; May 11, p. 297, and Oct. 10, p. 684-6) of this joint and statements of the claims made for it, and, therefore, it is only necessary to add Mr. Barschall's statement that within a very few years the saving in the cost of maintenance will pay for the joint.

British Railroad Statistics.

The urgent need of reform in the statistics relative to the working of British railroad companies was the subject of a paper recently read by Mr. W. M. Acworth, M.A., before the Royal Statistical Society. A large number of prominent railroad officials were present, amongst whom were Lord Allerton, Chairman Great Northern; Sir G. J. Armytage, Chairman Lancashire & Yorkshire; Mr. G. S. Gibb, General Manager North-Eastern; Mr. Oliver Bury, General Manager Great Northern; Mr. Henry Holmes, Superintendent of the line, and Mr. C. Jacomb Hood, Resident Engineer, London & South-Western; Mr. D. H. Davies, Great Central, and Mr. H. Doughty Brown, London, Tilbury & Southend.

As an introduction to his paper, Mr. Acworth produced some bulky volumes containing the statistical reports which are published in America, France, India, Germany, and Austria-Hungary, and compared them with the meagre two or three paged pamphlets published in England, which, he said, were not adequate to enable the shareholders to know sufficient about the position of the companies in which they were interested. Referring to the Railway and Canal Traffic Act of 1888, which enacted that the returns required of a railroad company shall include such statements as the Board of Trade may from time to time prescribe, Mr. Acworth said that unfortunately the Board of Trade had not hitherto, except in small details, used the powers so entrusted to them, and our English railroad returns remained to this day in all their archaic simplicity, a monument to the wisdom of our ancestors and the ancestor worship of their descendants.

No one was satisfied with the present condition of railroad affairs. The shareholders thought that the rates were too low; the traders thought they were too high, and finally, one go-ahead company—the North-Eastern—had set to work to ascertain and publish, for the first time since English railroads abandoned the keeping of ton-mile statistics for the special use of Dr. Lardner in the early fifties, what the rates actually were, and under what actual conditions of average length of haul and average weight of consignment these rates were charged. The time had come when the Board of Trade should intimate to the railroad companies its intention of revising completely the statutory forms of 1868 and 1871, and should, after consultation with the Railway Association of the Railway Clearing House, nominate a departmental committee to advise the board as to the shape and scope of the new returns and reports to be adopted in their stead.

Such accounts must be annual, not half-yearly. The publication of final accounts half-yearly not only caused the companies much unnecessary labor and expense, but make statistical comparisons between consecutive periods more than twice as difficult and less than half as effective.

The Board of Trade publish at present no less than 11 different series of reports and documents relating to railroads. The collection of all these miscellaneous and independent publications into a single statistical volume would be in line with the practice adopted in other countries, and would not only be a great convenience, but would also afford an opportunity for re-casting or even abolishing certain returns, for instance that relating to brakes, which are practically in a large measure obsolete.

A great railroad company must record its current affairs in thousands of volumes. Statistics of the traffic of individual stations, records of the comparative efficiency of co-ordinate district organizations, and so forth, clearly could not go beyond the board room. Again, daily and weekly and monthly returns should be compiled into annual or at least semi-annual returns, before they were published. Finally, no company could be asked to publish information which might help its rivals to abstract its business.

It was impossible, however, to ignore the fact that there were among many of the men who had the actual management of English railroads a strong prejudice against the publication of any figures beyond those which they already give, and to which they have presumably grown reconciled by time. "Why," say they, "should we give any more information? It will only be used against us; we shall make a rod for our own backs." With respect, he did not think their argument sound. Honest criticism would be better when based on facts instead of surmises. Malevolent misrepresentations could be better answered by statistical facts than by benevolent counter guesses. Critics both abroad and in this country had assumed for a generation past that English passenger fares were the highest in Europe, averaging about 1d. per mile. Actual figures for one line for one month had recently proved the average to be three-fifths of this amount. If this latter figure be typical, it would not be too much to say that, having regard to the service given, English passenger fares instead of being the dearest were about the cheapest in Europe. So with goods rates. Every trader was bred in the belief that English goods rates were extortionate. For his own part he had no doubt that the publication of precise figures as to average rate and length of haul would show that the rates charged in England for English weights of consignment, carried English distances, under English conditions, were lower than would be charged for similar traffic carried similar distances under similar conditions in any other important country.

Mr. Acworth then proceeded to compare in detail some typical American and English railroad reports, which he said would show that outside England expenditure on the road, whether out of capital or out of revenue, was both itemized and localized in a way quite unknown here. The railroad manager would smile at the idea of any such particulars being given in this country. The present figures were obviously insufficient to enable shareholders to know what their property was, how it was being maintained, and where the money for this latter purpose was coming from.

In America, he pointed out, different methods were employed. With their characteristic tables and statistics before them, railroad shareholders had only themselves to thank if their directors, over a series of years, allowed their property to run down. One of the specimen tables subjoined to the paper showed that the company had increased its locomotive power about 12 per cent. during the year, its carriage capacity about 3 per cent., and yet that no charge whatever had been made to capital on this account. Another table, with its large percentages of engines "in service needing repairs," was a striking proof how the rush of traffic in America had overtaxed the resources even of the greatest and richest companies. Of course it was bad economy to work engines needing repairs. But where the alternative was not to carry the traffic at all it was the lesser of two evils. Still the company did something to cope with its difficulties, as it put a new engine into service every three days throughout the whole twelvemonth. In this report, too, salaries and wages were divided under a dozen heads, and train staff separated from station staff, goods yard staff, and signal staff, all of whom were lumped together with us. The French returns classified the staff in 24 categories; giving for each company the number in each category, but did not show the wages paid to them. Our Board of Trade did at regular intervals publish a census of railroad employees in different classes, but had never, he thought, endeavored to correlate the numbers with the wages paid, which latter figures were annually dealt with in this report.

As to the German statistics, issued for the whole empire by the Reichseisenbahnamt (Imperial Railway Office), Mr. Acworth stated they were vastly more detailed.

Coming back to England, Mr. Acworth showed that the Great Eastern, for example, carried, not counting season-ticket holders, 120 million passengers per annum. How many of these were beyond a 10-mile radius round Liverpool street? It was practically impossible from any figures published at present to obtain even an approximate idea of the traffic and the revenue either of a suburban line, of a main trunk line, or of an agricultural branch. In France it was quite otherwise. The system of their Eastern Railway, for instance, was divided into 86 different sections. For each of these sections separate statistics showed the tons and passengers carried, the ton and passenger mileage, the revenue from passengers and goods respectively, the working expenses, and the net receipts. He confessed, however, to wondering what it cost to produce these very interesting figures, and whether anything except the financial partnership between the French companies and their Government would justify that expense.

DISCUSSION.

Mr. Gibb thought the time had come when a revision of railroad accounts was necessary, as he confessed that the present form of accounts was inadequate. They did not give a sufficient amount of information to enable any one to form a sound judgment as to whether the affairs of a railroad company were being conducted in the best manner. Financial stability need not enter into the question at all, as shareholders could only judge of the permanent stability of a concern from detailed accounts showing the economy in working and average charges. On the whole, he did not dissent from the main view of the paper, and it was difficult to see from what source any objection to a revision could be raised, especially as there was no claim that the accounts should enter into matters which were necessarily for the private information of the directors and managers of the companies.

One ought to consider from what point of view the form of accounts should be regarded. First of all, there was the point of view of the management, then the points of view of the shareholders, intending buyers, traders or customers, and finally the general public. From the railroad companies' point of view, he said there was nothing to fear in a revision of the form of accounts; what they had to fear was the injury which might be done to the companies by ignorance, in the absence of proper accounts. It would be an advantage to railroad managers if there were more data available for criticism. Every profession benefited by outside criticism, and what they should do was to try and infuse into that criticism as full a measure of sense as possible, and above all take care that their critics should be in possession of all needful facts. As to the means of effecting the revision, he was inclined to think that the Board of Trade should

co-operate with the railroad companies to form some committee which would discuss and report upon the matter.

Sir Henry Burdett in giving his warm approval of the object with which the paper had been written, expressed the opinion that unless radical changes were adopted in connection with English railroad statistics, there would be a very serious fall in railroad securities as an investment. There was no doubt that the present American system, reformed and strengthened by the introduction of judicious administration on the part of managers and directors, offered a great deal for the study and information of the managers in this country.

Other speakers followed, the majority of whom strongly supported the recommendations put forward by Mr. Acworth, though Lord Allerton said that, speaking as a railroad director, he could not agree with Mr. Gibb in inviting the co-operation of the Board of Trade in a revision of railroad accounts. Although a previous speaker had let fall some remarks to the contrary, he could state with authority that the accounts presented to the public were always accurate, reliable and honest, whatever faults they might have as regards form, but he was of opinion that a different system of tabulation and classification of information might with advantage be adopted, which would, no doubt, be of the greatest value to all. Referring to Mr. Acworth's comparison between American and English accounts, he said that he was surprised that Mr. Acworth had not alluded to the returns issued by the Indian railroad companies, for, as a shareholder in a few Indian railroads, he invariably found that the reports they issued were always complete and perfectly comprehensible. So far as the shareholders were concerned, his experience was that after they had seen a certain figure in the reports—the amount of dividend—they put the rest aside to be read at a more convenient time.—*Condensed from Transport.*

Chimney Notes.

BY WILLIAM WALLACE CHRISTIE.

During the great fire in Paterson, N. J., a year ago, one of the buildings burned and ruined was the boiler house of the old Edison Electric Light Station on Paterson street, where there was an octagonal brick chimney having a square base and built with a double shell, that is, the inner lining or flue extended independent of the outer shaft to the top of the chimney. The diameter of the round flue was 8 ft. and the height of the chimney 200 ft.

This chimney was built several years ago of ordinary red brick, laid in lime mortar, and contained 287,500 bricks. It has been a very successful structure and was in use in heavy service until the station was moved to another location. The room occupied by the old chimney, and more especially the brick it contained being wanted, it was decided to tear it down.

This work was done in August, 1902, by Peter L. Bergin as contractor. Four men on the chimney working from planks which were laid across the top, removed the iron caps in sections and tumbled them down alongside the shaft, and with picks loosened the brick-work and tumbled the brick-work inside the flue, where it was taken out at the bottom later. The planking was changed from one position to another at right angles to it, as the work proceeded. Fig. 1 shows the chimney as it was the day they began to tear it down. In four days it was taken down one-half its height, or 100 ft.

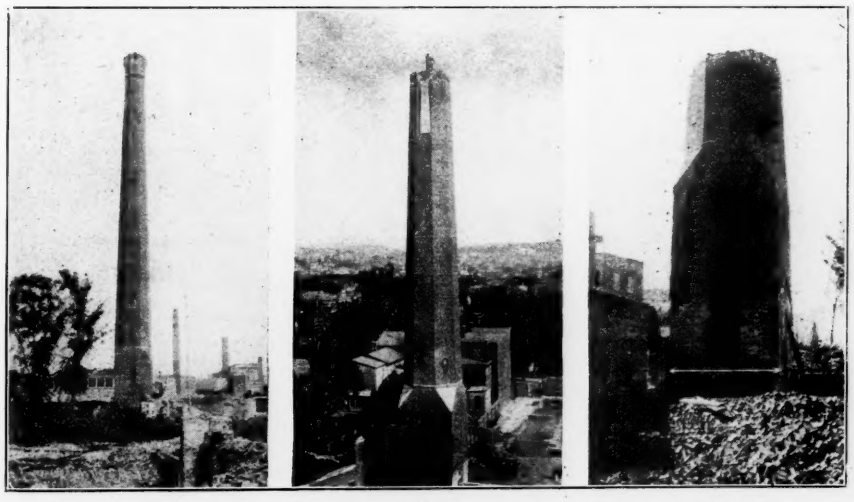


Fig. 1. *Fig. 2.* *Fig. 3.*

Tearing Down a Brick Chimney.

(Chimney balanced along white line shown in Fig. 3.)

To get the remaining 100 ft. down, staggered holes were drilled, about 10 ft. from the bottom, all around the chimney excepting on the side having the flue entrance. Dynamite cartridges were exploded in these holes and it so happened that the masonry was raised enough to balance it upon an area 8 in. wide on the outer edge of the shaft on the side containing the flue entrance.

The area of the bearing at this point was about 7.33 sq. ft., and those who are acquainted with the theory and the actual result of pressure from heavy brick loading with common brick, as in this case, will hardly credit the statement as true. To get this 90 ft. down a long pipe crow-bar was used, and the masonry was so nicely balanced that it was readily tipped over enough to crumble the brick below it, and finally fall in a large pile, the bricks not scattering at the most over 40 ft. from the shaft.

The total time required was eight days with five men including a foreman. In a recent issue of the *Scientific American* is described the taking down of the 153 ft. chimney of the Capital Traction Company, Washington, D. C., which took two weeks. The brick work for the upper 60 ft. of this latter stack was lowered on the outside by hand.

In making a comparison of the costs of installation of chimney or forced draft outfits, it has been customary to say that a chimney costs a certain amount of money, without making any qualification as to its type or design. The fact that there is a vast number of types of chimneys and consequently an equally wide range of costs is lost sight of. In an article by the writer in the *Railroad Gazette* a couple of years ago, he gave a list of a number of chimneys and the cost of each per "boiler-horse-power," the cost varying from $1.66 to $6.93 per boiler-horse-power. Probably there is a still wider range of prices, but these figures are sufficient for our purpose.

Brick chimneys are built with a separate inside flue, this flue in some cases being independent of the outer shell throughout the entire height; in other cases joined to the outer shell part of the way up, or at the very top. Then, again, the flue or inner shell may be partially or wholly lined with fire-brick. Calculating the measure of stability of a brick chimney also gives various results for different chimneys, and that the designer may have his own idea about the matter, is very evident; for in three chimneys, each a different style or pattern, with the same inside diameter of flue and height, I have found three widely varying factors of stability.

The stability of a chimney is not always determined by the above factor alone, but is also influenced by the conditions present during its construction, its type or design, the quality of brick used in its construction, the mortar, sand and time required for or speed of building the shaft. A chimney which was considered safe by its designer and had a large factor of stability or safety, was laid up rapidly in poor mortar, during bad weather, and collapsed while another designed to take its place was built lighter in every way with a slightly less factor of stability or safety, requiring about half the number of brick the original one contained, and has proved a success; the unit load on the same area of ground covered by the concrete sub-foundation was also reduced from 1.94 tons per sq. ft. in the first case to 1.16 tons per sq. ft. in the second case. The pressure per square inch at the base of the brick work was reduced from 117 to 89.3 lbs.; the wall thickness at the top of shaft was reduced one-half; at bottom it was reduced 35 per cent. All of this variation of weight meant a like variation (relatively) in its cost to the buyer.

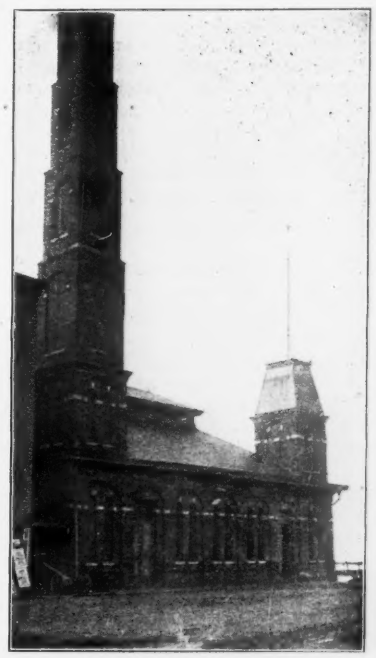
I have always thought that mill operators or owners pay too much attention to making a small deduction in price of piece work, often only a fraction of a cent per hour for labor, while they display so little interest in an economical power plant, where in this same plant the cost of operation may vary 30 per cent. This 30 per cent. might be added to the profit side of the ledger if this same power plant had been properly designed and constructed with regard to the boilers and their settings; the engines and auxiliaries; the chimney which furnishes the draft required for the proper and economical combustion of the fuel; all this making a large reduction in the cost of fuel.

Many large corporations will have plans and specifications made for an improvement to cost, say, $3,000, all this being very well; at the same time these same corporations will employ men unskilled in the designing of a chimney to prepare plans and specifications for a chimney that will cost thousands of dollars, and then allow any contractor to erect this same chimney from these plans, oftentimes with considerable loss to the owners and, in not obscure cases, with the result cited above.

Different plants have different requirements; one plant may need a chimney as a temporary structure; another plant may need a chimney for a certain set of fixed conditions which are likely to remain for an indefinite time; another plant, which is continually growing, may want one kind of a chimney for present needs. The chimneys for all of these plants should be designed only after a careful study of the separate needs of each plant, by both the owner and his consulting engineer.

A successful brick chimney which has been in use since 1874, and has some interesting features is that of the Water Works Pumping Station at Hudson, N. Y.

This station was designed by J. B. G. Rand, and contrary to the usual custom of a separated chimney, that part of the chimney below the gutter line of the power house is in effect a part of the building and



Brick Chimney at Hudson, N. Y.

makes one of its corners, extending down some 12 to 15 ft. to the boiler room floor level below the street line, shown in the picture.

The general dimensions are:

Height	100 ft.
Outside width of square at base	11½ ft.
Inside size of square flue at bottom	3 ft.
Inside size of square flue at top	4 ft.

The inner flue extends upward 86 ft., and is separate from the outer shell throughout. This peculiar construction of flue, increasing in size upward, is used in very few chimneys.

The draft is good in the Hudson chimney, except when the wind blows cornerwise across its top, when the gases eddy about inside the top (as has been observed by looking up the shaft), and smothers the draft. This criticism of this particular chimney might well apply to all square chimneys.

On the continent where chimney design and construction has been reduced to a very exact science, and where their design is much more artistic than here, and their cost less, the circular section is almost invariably used.

The outside step construction used here may also be used to good effect in chimney shafts of circular section.

A Japanese Dining Car.

From a Tokyo Correspondent.

One of the most delightful railroads in Japan is the Sanuki line, leading from the seacoast to the great shrine of Kompira. This "Holy railroad" is a narrow-gage line of 27¼ miles running from Takamatsu to Kompira in the Island of Shikoku, the beautiful island which forms the southern boundary of the Inland Sea. The road seems to have been built with the special object of conveying from the seaport to the great shrine of Kompira the large crowds of pilgrims that resort to that shrine from all parts of Japan every year. This shrine, or temple, is one of the most famous in Japan, and has the honor of having a shrine built in imitation of it and called by its name in almost every city in the empire.

Small as it is, this railroad is a paying concern; it pays, I think, 25 per cent. a year to its shareholders; and though, on account of its leading up to a temple, it may be regarded as having a holy character, it does not disdain little worldly attractions such as a capital dining car where the weary pilgrim can lay aside his staff in order to have a good dinner and a better drink, with some charming Japanese girls to wait on him. These waitresses are, as a matter of fact, *the* feature of the railroad. The manager of the Sanuki Railroad has been kind enough to let me have the particulars of his rather bold innovation. It seems that these girls were selected from about 30 applicants, and that they had to possess the following qualifications: (1) A passable personal appearance; (2) some education; (3) good health; (4) good conduct; (5) no "past." (For even in Japan there are "women with a past.")

The waitresses rank as officials of the railroad and have to comply with the following regulations: (1) Hair to be dressed in the *agemaki* style—resembling a Greek helmet. (2) Costume to consist of a *kimono* of an improved style (i.e., minus the usual long sweeping

sleeves of that garment. (3) The girls will get a rest by turns in the mornings and afternoons, and all day every sixth day. (4) The wages are to be 18 sen (36 cents) a day. (5) While on duty the girls are to behave with military discipline, to take no "tips," and to refrain from chattering with the passengers. When passengers are in the dining car the waitresses, if not at work, are to stand in a corner.

Among the girls who have entered this service are many from respectable families and all have behaved so far in a model manner. "The company had," I am informed, "apprehended that passengers might behave vulgarly towards them, but happily every respect has been paid to them and the railroad authorities consider the service a success." In spite of these assurances an American gentleman by the name of Snodgrass, who was once a regular missionary but is now a sort of religious free-lance and editor of a religious paper, *The Voice*, attacks this innovation with great heat and says that in America girls are not employed in hotels even.

New York Central Betterments Since 1899.

In 1901, the *Railroad Gazette* published a series of articles showing the changes which had taken place in the status of the engineering department of the New York Central, and the work done by it, since the accession of Mr. Wilgus as Chief Engineer, in April, 1899. Previous to that time, the track force was controlled by the operating department, and the engineer's office had no especial recognition from the company, except in so far as it served as an information bureau. Each division engineer had his individual methods, with which the company was little concerned, and the route to the west could have been described as a series of connecting divisions, rather than as a centralized, highly organized railroad.

With the change in engineering management, the Chief Engineer was placed in entire control of the roadbed, including bridges and buildings, the maintenance, and the handling of wrecks, and the department was thoroughly reorganized and put into shape for systematic, intelligent and aggressive work. A summing up of the work done during this period is timely, because, in a sense, a period seems to be completed, for there is now an evident tendency toward a divisional organization. The recent changes, in pursuance of which the engineer of maintenance of way reports directly to the general superintendent, although only a step toward it, is nevertheless indicative that at a future time the maintenance officers will report directly to the division superintendents.

The accompanying table shows what has been accomplished between April, 1899, and the present time, and also what is projected for the immediate future.

The company has tried, little by little, to close all minor openings in the roadbed, and 909 have been disposed of; 525 by the use of cast-iron pipe, and the remainder by means of standard solid rail floors.

For the motive power department, 12 new engine houses have been built, with a total of 198 stalls, and nine, with a total of 206 stalls, have been remodeled. Eight hundred lineal ft. of double-track concrete ash pits, and 2,691 ft. of single-track concrete ash pits have also been laid.

Besides the important changes in fuel and water supply stations; electric light plants, heating plants, etc., 76 passenger stations and freight houses have been built.

The work which has been done on the roadbed proper includes the ballasting of 2,277 miles of track; 72 miles of new double tracking, 36 miles of new single main track, 168 miles of yard tracks, 59 miles of passing tracks and 124 miles of sidings. Resurveys of the road have also progressed, with over 3,000 miles of levels, remeasurements and ballast profiles, in addition to which a large portion of the territory has been covered by modern right of way maps.

In the signal department, 118 miles of track have been protected by electric automatic signals, and 16 miles with the new Hall automatic semaphore, worked by liquid gas and controlled by electricity. Twelve pneumatic interlocking plants have been established, with 539 levers, and 75 mechanical interlocking plants, with 1,491 levers.

Description and unit.	Quantity. 1899.	1900.	1901.	1902.	Total.	Projected.
Steel railroad bridges, total number	16	59	144	115	334	469
Weight, tons	1,979	10,567	18,397	17,714	48,648	133,000
Length, ft. S. T.	5,272	14,838	25,740	21,670	67,520	125,000
Steel highway bridges, number	3	7	6	12	28	117
Tons	226	346	219	905	1,696	15,933
Turntables, number	...	9	8	15	32	21
Ashpits, total, lin. ft.	80	1,161	950	1,300	3,491	1,040
All steel work, total, tons	2,220	12,068	20,197	18,963	53,448	165,000
Concrete, total, cu. yds.	15,745	40,014	101,549	174,306	331,614	480,805
Cement used, total, bbls.	28,116	68,706	117,080	220,753	434,655	565,000
Stone masonry, total, cu. yds.	27,180	23,493	13,649	11,456	75,778	13,474
Openings in track eliminated, total, number	134	224	219	332	909	491
Engine houses, new, number	1	2	3	6	12	12
New, stalls	18	29	72	79	198	112
Remodeled, number	2	1	...	6	9	2
Remodeled, stalls	35	8	...	163	206	50
Passenger stations, number	3	4	1	13	21	52
Shop buildings, new, number	3	9	14	12	38	9
Remodeled, number	...	...	1	2	3	2
Freight houses, number	5	4	5	9	23	35
Sq. ft.	11,220	6,480	3,920	76,420	98,040	168,000
Modern heating plants, total, number	1	8	10	29	48	23
Electric light installations, total, number	2	12	20	77	111	47
Power houses, number	...	1	2	3	6	7
Water supply—						
Plants, new, number	1	13	19	20	53	26
Plants, remodeled, number	1	5	17	25	48	66
New and remodeled, gals. 24 hrs.	340,000	4,840,990	8,788,600	8,358,078	22,327,668	8,522,000
New columns, number	3	35	66	57	161	98
New tanks, number	7	23	18	37	85	81
New troughs, number	...	6	2	3	11	1
Signals—						
Controlled manual system, miles S. T.	...	3	...	...	3	...
Automatic electric, miles, S. T.	...	...	...	118	118	234
Automatic gas, miles S. T.	...	...	...	16	16	200
Interlocking plants—						
Pneumatic, number	1	1	6	4	12	39
Pneumatic, levers	42	43	298	156	539	1,271
Mechanical, number	3	15	34	23	75	54
Mechanical, levers	80	319	667	425	1,491	1,480
Towers, new, number	4	6	17	12	39	80
Remodeled, number	...	2	6	3	11	6
Rails, new, in main track, tons	33,836	38,688	39,761	37,000	149,285	30,000
Rails relaid, in main track, tons	16,184	29,441	42,167	45,563	133,355	19,580
Stone ballast, cu. yds.	72,009	153,708	177,919	267,169	670,805	295,000
Miles	57	87	132	156	432	180
Gravel ballast, cu. yds.	472,356	353,163	215,729	645,876	1,687,124	456,000
Miles	374	403	163	385	1,325	300
Cinder ballast, cu. yds.	175,000	240,000	250,000	270,000	935,000	270,000
Miles	110	150	160	190	610	190
Double tracking, miles	...	5	25	42	72	57
Single, main track, miles	1	4	2	29	36	68
Yards, miles	11	32	37	88	168	107
Passing tracks, miles	3	8	20	28	59	24
Sidings, miles	20	34	29	41	124	41
Rip-rapping, cu. yds.	110,746	125,000	200,000	176,000	611,746	250,000
Grade crossings eliminated, number	6	5	1	17	29	44

An abstract of the statistics shows that 334 steel bridges, of aggregate single track length of 67,625 ft., and weighing 48,648 tons, have been completed under the new regime; also 28 steel highway bridges, weighing 1,690 tons in the aggregate, and 32 70-ft. turn-tables. A specialty has been made of concrete work, and the latter has been adapted to a large number of diverse purposes. The total amount completed in the period has been 331,614 cu. yds., in addition to which 75,778 cu. yds. of stone masonry have been built.

Electric Traction On An Italian Main Line.

The December issue of the *Bulletin* of the International Railway Congress contains an article by Mr. J. Rocca, Chief Inspector of the Italian Mediterranean Railroads, describing the introduction of electric traction on a main line railroad in Italy. The article was written in March, 1902, and some important extension has been made since that date.

This was the first trial of electric traction on Italian main lines, but it is believed that it will be considerably extended and imitated. The line described is from Milan northeasterly toward Lugano. This line is 81 miles long, the part in working at the time of the writing of the paper having been 37 miles.

An experimental service was put in operation Oct. 20, 1901, and on Nov. 20 steam locomotives were entirely withdrawn from passenger service. Up to the time of the publication of the paper four months of regular service had been carried on by electrical traction. The writer does not discuss the commercial aspect of the service, or the reduction of passenger fares, or the increase in the number of passengers brought about by reduced fares and frequent and pleasant service. The line runs through a favorite suburban region.

The system makes use of the third rail conductor and of continuous current in the motors. The transmission is by high tension three-phase current. This is put on the transmission line at 13,000 volts and there are four sub-stations where the current is transformed to 650 volt continuous current. The transmission line consists of six copper wires carried on creosoted beech poles. The third rail is protected at level crossings and in stations.

There are 20 electric motor cars of the American type carried on four-wheel bogie trucks. Each motor car is driven by four geared motors. Thomson-Houston type, of 75 h.p. each. The cars are fitted with Westinghouse compressed air-brakes, the compressing pumps being driven by small electric motors. The signal whistle is blown by air. There is also an emergency hand brake on each car. The trailers are also of the American type of bogies, and they are fitted with Westinghouse brakes and emergency hand brakes. All of the cars are lit and heated electrically. The trailer cars have accumulators from which they are lit when they are not coupled to motor cars, for these cars make part of their journey in steam trains.

The normal train is one motor car and one trailer, weighing about 75 tons, with passengers on board. The motors are designed to drive this train at 56 miles an hour.

Electric locomotives are also supplied to haul certain trains carrying baggage, post office vans, and also some passenger cars. These are equipped with four 75 h.p. motors, but the gear ratio is designed for less speed and more power than the motor cars. These locomotives are intended to haul a train made up of one postal van, two trailers, as described, and two ordinary passenger cars.

In order to run heavy fast trains it has been decided to use a multiple train control and so put more motor cars in a train. Probably this will get rid finally of the electric locomotives.

A regular steam freight service has been kept up, but there has been considerable difficulty in arranging the schedules to get these trains in amongst the numerous electric trains.

Difficulty was anticipated with snow on the third rail, but experience through the four months reported on has shown no serious trouble. The electric trains have not been interfered with more seriously than steam trains. After a few trials, it was found unnecessary to use brushes in front of the contact shoes, as the shoe itself cleared the rail.

A postscript to the article dated two months later states that the number of electric trains in service has been raised 32 in each direction, not counting additional trains on holidays.

Corrosion of the Steel Frames of Buildings.*

The constantly increasing use of steel as a structural member in modern buildings has led to many questions as to the permanency of the steel as sometimes used for this purpose. The examination of buildings ten to fifteen years old, when, during alterations, the steel framework has been exposed to view, reveals all stages and conditions of disintegration of the steel. So great has been the corrosion, even in this short time, in some cases, that a note of alarm has been sounded by some engineers most familiar with the subject. The use of steel beams and posts is of so recent date that no very exact deduction can be drawn as to the exact time required for a very serious or destructive loss of steel through corrosion; but surely, when a steel plate one-half inch in thickness loses more than one-eighth of an inch in five years, there arises a question as to the ability of the structure to last more than 25 years.

To study the matter systematically, two brands of American Portland cement (*Alpha* and *Lehigh*) were selected; two kinds of cinders; a sharp, clean beach sand; and a hard, clean broken stone, the larger part being fragments of flint and trap rock. Concretes were made up in bricks about 3x3x8-in., with the steel specimens near the center.

It was hoped to vary the density, the porosity and the nature of the contact with the steel, as well as the chemical composition of the concretes. The cements were tested chemically and physically and found good. The cinders, when washed down with a hose stream and dried, tested distinctly alkaline, and analysis revealed very small amounts of sulphur. The stone and sand were thoroughly washed and clean. The ingredients were mixed dry in every case and, when wet, thoroughly mixed and tamped until wet on top.

At the end of three weeks the briquettes were carefully cut open and the steel examined and compared with specimens which had lain unprotected in each of the tin boxes. Those specimens which were mixed of neat cement can be dismissed without discussion, for the protection was perfect. The steel was as bright as when put in. The unprotected pieces were found to consist of rather more rust than steel. Of the remaining specimens, hardly one had escaped serious corrosion.

From the examination of these several hundred briquettes we were able to draw several conclusions:

First. Neat Portland cement, even in thin layers, is an effective preventive of rusting.

Second. Concretes, to be effective in preventing rust, must be dense and without voids or cracks. They should be mixed quite wet where applied to the metal.

Third. The corrosion found in cinder concrete is mainly due to the iron oxide, or rust, in the cinders and *not* to the sulphur.

Fourth. Cinder concrete, if free from voids and well rammed when wet, is about as effective as stone concrete in protecting steel.

Fifth. It is of the utmost importance that the steel be clean when bedded in concrete. Scraping, pickling, a sand blast and lime should be used, if necessary, to have the metal clean when built into a wall.

*Abstract of an article by Mr. C. L. Norton in the *Technology Quarterly*, Dec. 1902.

Handling Small Packages at the Austerlitz Station—Orleans Railroad, Paris.

In our issue of Nov. 15, 1901, we published a description of the method of handling baggage mechanically at the Quai d'Orsay of the Orleans Railroad, in Paris. The Orleans company has also installed facilities for the rapid handling of small packages in large quantities. The problem was that of handling from 18,000 to 26,000 small packages, sorting them, and despatching them by several routes in a way to facilitate unloading at their destinations. Latterly the packages are put in baskets destined either for a single station or for a few small stations in a restricted territory. This necessitates the daily despatching of from 500 to 600 baskets to about 250 different places.

Almost all of this traffic is sent out between 7:30 p.m. and midnight. Arrival at the platform is very irregular throughout the afternoon and reaches its maximum between 6 and 8 o'clock in the evening, just before the departure of the trains. During these two hours there are received from 12,000 to 16,000 parcels. They must, therefore, be handled and sorted very rapidly. Before the introduction of mechanical means, the work was done on a crowded platform, and delays in forwarding were frequent. This led to the use of mechanical devices here described. The description and illustrations are from the *Revue Generale des Chemins de fer.*

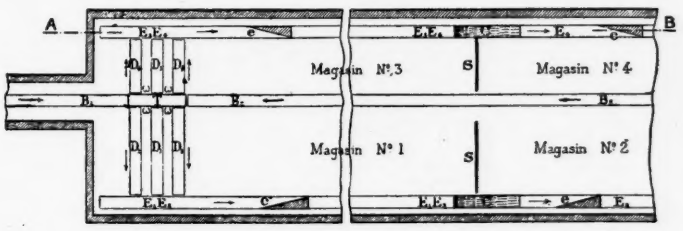


Fig. 1.

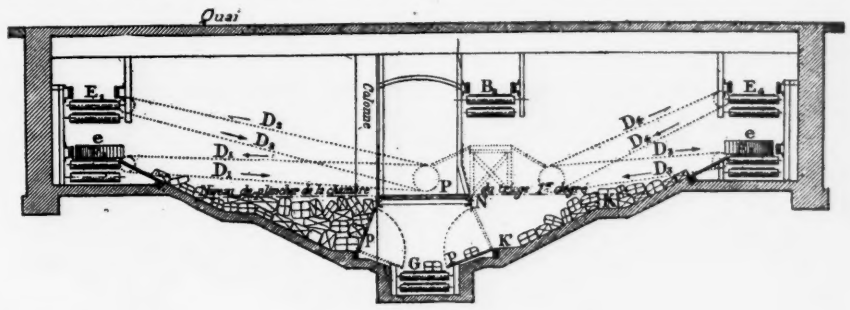


Fig. 2.

The packages are received, receipted for, checked and marked upon the outgoing platform. They are then sent by a chute and conveyor to one of four storerooms, which is beneath the platform, from which they are taken to the trains.

The first movement is to mark the package for the storeroom, train and route and throw it into a chute from which it is discharged upon a belt conveyor. The conveyor carries it to a sorting table. This table is near the center of the underground room. Four employees are there and the table is served by the two conveyors, B_1 and B_2 of Fig. 1. The employees take the packages and, guided by the numbers marked thereon, put them upon that one of the six transverse conveyors D, having the number corresponding to the marking of the package. The arrangements are such that each one of the men stationed at W can send out the parcels in any one of the four directions, D_1, D_2, D_3 or D_4. Packages marked O and intended to form a part of a carload lot are put upon a special overhead conveyor.

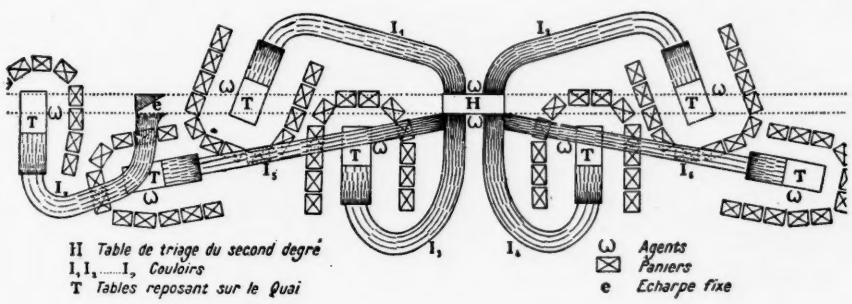


Fig. 3.

The packages put upon the transverse conveyors D do not go directly to the storerooms, but are automatically transferred to the longitudinal conveyors E. By this arrangement the number of men at the table can be varied to suit the needs of the traffic, one man being enough during the day, and two men are all that have, thus far, been required at any one time. One sorter can handle from 3,000 to 4,000 packages an hour, at the first sorting. Starting again from this point, a package intended for any particular storehouse, as No. 3, is put upon its corresponding conveyor (D_3 and E_3) and thus carried until it reaches a traveling deflector *e*, by which it is scraped off from the conveyor and dropped upon the inclined floor of the storeroom. This deflector moves to and fro, from one end of the storeroom to the other, at a speed of about 3¼ ft. per minute, and serves to distribute the packages uniformly along the whole length of the room.

Fig. 2 shows a cross-section of two of these rooms, with the first sorting table and the distributing conveyors leading therefrom shown by dotted lines.

The packages delivered here slide down to the foot of the floor and pile up against the trap doors *p*, an attendant on the footway K seeing that the upper portion of the incline is kept clear for the packages delivered to it by the conveyor.

When the time comes for the second sorting the trapdoors P are opened and the packages are allowed to drop upon the conveyor G, by which they are carried to a sorting table located at H, Fig. 3. There the two attendants, one on either side, throw the parcels into one of the six chutes, I_1, I_2, I_3, I_4, I_5 or I_6, that lead down to the final sorting tables T. At those points an attendant throws them into the proper basket of the row by which he is surrounded. A section of the chutes is shown in Fig. 4. The sorting is thus finished and the baskets are sent off to be placed on the cars.

There are five places on the line to which special cars are despatched, and these require a separate system of loading, which is practically a duplication of the method already described. At the first sorting of the packages on the receiving platform those intended for carload lots are thrown into a separate conveyor and carried to a sorting table. There they are redistributed into chutes leading to storage bins, from which they are allowed to slide out upon chutes and conveyors. They are then mechanically carried to the car to which they have been assigned.

It has been learned that the deliveries are comparatively few in the morning, and the conveyors are therefore not started until 11:30 a.m. They are run until 4:30 p.m., during which time they carry about three thousand packages. The machinery is started again at 6:30 p.m. and run until 11:30 p.m., making 10 hours of operation in all. Besides the six or seven men on the receiving platform, who have various duties to perform, 14 men are distributed along the line of the conveyors, at the several sorting tables and elsewhere, to carry on the operations. With this number of attendants the average number of packages handled is about 30,000. Eighteen thousand of these are packed in baskets and the others are loaded directly into the cars, as already indicated.

The system permits of but little chance of a parcel going astray, since the address is read three times on those sent out in baskets, and twice on those shipped in the cars. There are practically no errors in sorting.

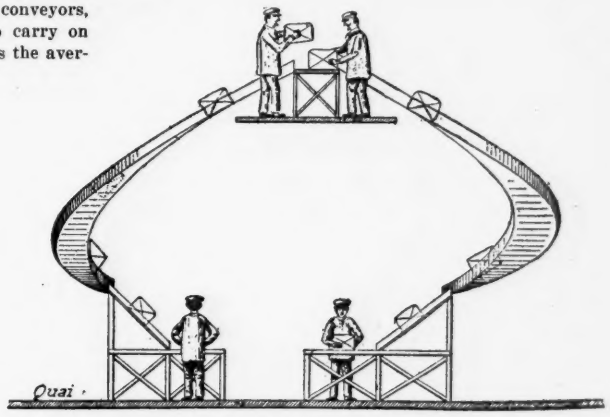


Fig. 4.

Train Accidents in the United States in December.[1]

dn, 1st, Southern Pacific, Portland, Ore., an empty engine broke through a trestle bridge and fell 30 ft. to the mud bottom of the Willamette River. It is said that the accident was due to a misplaced switch, which allowed the engine to run upon a track not in condition for use.

rc, 2d, Pittsburgh, Cincinnati, Chicago & St. Louis, Piqua, Ohio, a freight train ran into the rear of a preceding freight, wrecking the caboose and six cars and throwing the engine down a bank. There was a dense fog at the time.

rc, 2d, Northern Pacific, Eltopia, Wash., an empty engine standing at the station was run into at the rear by a following freight, and, having been deserted while steam was on, ran at high speed several miles. Between Eltopia and Lake it met a westbound freight and both engines were badly damaged.

xc, 2d, Pennsylvania road, Sharpsburg, Pa., a work train backing through a crossover track was run into by a through freight train, and several cars were wrecked. The telegraph line, a store and a dwelling house were badly damaged and three trainmen and one woman in the house were injured.

dn, 2d, West Virginia Central, Douglas, W. Va., a freight train consisting of an engine and 22 cars became uncontrollable on a descending grade and was derailed at a curve. The whole train was badly wrecked and the engineman was killed.

unf, 2d, 3 a.m., Rio Grande Western, Westwater, Utah, westbound passenger train No. 1 was derailed by a land slide, and the locomotive was wrecked. The fireman was killed and two other trainmen were injured.

2d, Boston & Albany, Boston, Mass., the locomotive of a passenger train was derailed and overturned. The engineman was killed and the fireman and three passengers were injured. The derailment occurred at the junction of the Brookline Branch.

dn, 3d, 5 a.m., Pennsylvania road, Windber, Pa., a train of cars loaded with gravel, no engine attached, left standing on a grade, was in some way started, unattended, and ran off the track at a switch. The train consisted of 61 cars and 49 of them were wrecked.

unf, 3d, 4 a.m., Cincinnati, New Orleans & Texas Pacific, Sunbright, Tenn., passenger train No. 3 was derailed by running into a large casting which had fallen on the rails from a freight car standing on a side track. The two engines and first five cars of the passenger train were completely wrecked and the combustible portion of the wreck took fire and was entirely burnt up. The fireman and express messenger were killed and their bodies were destroyed in the fire. A negro tramp was also killed and a mail clerk was injured. The train had on board 203 passengers, and six cars escaped damage. The fall of the casting was due to the crushing of the car by a freight train which had backed into the side track.

unx, 3d, Atchison, Topeka & Santa Fe, Wakarusa, Kan., the second section of passenger train No. 5 was derailed at a frog and seven cars were ditched. Two passengers and one trainman were injured.

bc, 4th, Cleveland, Cincinnati, Chicago & St. Louis, Linndale, Ohio, butting collision of freight trains; both engines and several cars wrecked. Six employees were injured, two of them fatally.

xc, 4th, 2 a.m., Pennsylvania Lines, Coshocton, Ohio, collision between a work train and an empty engine; engineman killed and eight other trainmen injured.

4th, Southern Railway, Campebelle, S. C., a freight train was derailed on a trestle bridge and eight cars, with most of the bridge, fell to the creek below.

rc, 5th, Boston & Maine, South Ashburnham, Mass., a freight train ran into the rear of a preceding freight, doing slight damage. Two brakemen, who jumped off to avoid injury in the collision, landed in front of a passenger train on the adjoining track and were killed.

xc, 5th, 1 a.m., Northern Central, Ralston, Pa., a freight train broke in two and a number of cars ran back into the head of a following passenger train, badly damaging the engine and four freight cars. The fireman was injured.

bc, 7th, Atchison, Topeka & Santa Fe, Peach Springs, Ariz., butting collision of freight trains, wrecking both engines and several cars. One engineman and two other trainmen were injured.

unx, 7th, St. Louis, Iron M. & Southern, Hanson, Ind. T., a freight train was derailed and wrecked and two tramps were killed.

unx, 7th, Mobile & Ohio, Columbia, Ill., a freight train was derailed and 15 cars were wrecked; a tramp was killed and another fatally injured.

bc, 8th, Pennsylvania Lines, Youngstown, Ohio, butting collision between a passenger train and a freight, damaging the engines and two freight cars. Two trainmen were killed and three were injured. It is said that one of the two main tracks was being used as a single track and that the collision was due to the neglect of a flagman.

bc, 8th, 9 p.m., Chicago & North Western, Hurley, Wis., butting collision between a southbound freight and

[1]Accidents in which injuries are few or slight and the money loss is apparently small, will as a rule be omitted from this list. The official accident record published by the Interstate Commerce Commission quarterly is regularly reprinted in the *Railroad Gazette*. The classification of the accidents in the present list is indicated by the use of the following

ABBREVIATIONS.

rc	Rear collisions.
bc	Butting collisions.
xc	Miscellaneous collisions.
dr	Derailments; defect of roadway.
eq	Derailments; defect of equipment.
dn	Derailments; negligence in operating.
unf	Derailments; unforeseen obstruction.
unx	Derailments; unexplained.
o	Miscellaneous accidents.

An asterisk at the beginning of a paragraph indicates a wreck wholly or partly destroyed by fire; a dagger indicates an accident causing the death of one or more passengers.

a northbound empty engine, wrecking both engines. Three trainmen were injured.

dr, 8th, 8 p.m., Atchison, Topeka & Santa Fe, Rothville, Mo., a passenger train was derailed at a switch which appears to have become misplaced after the engine had passed over it, and most of the cars were wrecked. The engineman and fireman were killed and one passenger and five trainmen were injured.

rc, 9th, 9 p.m., Delaware, Lackawanna & Western, Groveland, N. Y., a freight train, with an engine at the rear as well as one in front, standing at a water tank, was run into at the rear by a following freight which had become uncontrollable on a steep grade, and two engines and 12 cars were wrecked. One conductor and one brakeman in the caboose of the standing train were killed.

bc, 10th, Illinois Central, Clinton, Ill., butting collision between a passenger train and a freight during a dense fog; six passengers and two trainmen were injured.

bc, 10th, Illinois Central, Birkbeck, Ill., butting collision between a passenger train and a freight during a dense fog. Both enginemen and one baggageman were fatally injured.

xc, 10th, Baltimore & Ohio, Holden, Ohio, a freight train which became uncontrollable on a steep grade collided with another freight, wrecking both engines and many cars and damaging a station building. Two trainmen were injured.

10th, Central of Georgia, Rock Springs, Ga., a freight train was derailed on a trestle and 11 cars fell with the bridge to the valley below. The wreck took fire and was burnt up.

unx, 10th, Texas & Pacific, Shreveport, La., a freight train was derailed and the engine was overturned and fell down a bank, together with four cars of cattle and cotton. Three trainmen were injured.

11th, Pennsylvania road, Brilliant, Pa., a passenger train ran into the rear of a preceding freight and three freight cars were knocked down a bank. Three trainmen were injured.

xc, 11th, 4 a.m., Cincinnati, Hamilton & Dayton, Toledo, Ohio, collision between a freight train and a switching engine; one trainman killed and two others injured.

xc, 11th, Northern Central, Stanley, N. Y., passenger train No. 61 collided with a freight train which was switching on the main track, and both engines and several cars were badly damaged. One engineman was killed and one fireman injured.

bc, 12th, Southern Railway, High Point, N. C., passenger train No. 39 ran over a misplaced switch and collided with a freight engine standing on the side track, wrecking both engines, the baggage car and several freight cars. Six passengers and both enginemen were injured.

bc, 12th, Northern Pacific, Fridley, Minn., butting collision of freight trains, wrecking both engines and several cars. One trainman was killed and another was fatally injured.

dr, 12th, 1 a.m., Chicago, Rock Island & Texas, Terrall, Texas, passenger train No. 2 was derailed by a broken rail and the engine and several cars were wrecked. The engineman and fireman were killed.

*rc, 13th, 4 a.m., Illinois Central, Ripley, Tenn., rear collision of freight trains, one of which had been stopped on account of a hot journal. Six cars were wrecked and, with a trestle bridge, were burnt up. Two of the cars contained fireworks, and these apparently started the fire.

bc, 13th, Missouri, Kansas & Texas, Burleson, Texas, southbound passenger train No. 1 collided with northbound freight No. 106, damaging both engines. Two passengers were injured.

dn, 13th, Hannibal & St. Joseph, Brookfield, Mo., a derrick on a car in a wrecking train came in contact with the superstructure of the bridge over Yellow Creek and weakened the bridge so that the engine, cars and bridge fell to the stream below. The trainmaster and two employees were killed and five employees were injured.

unf, 13th, 10 p.m., Chesapeake & Ohio, Ronceverte, W. Va., passenger train No. 2 was derailed by running against a rock which had fallen on the track, and the engine was wrecked. The baggage car fell into Greenbrier River.

unf, 13th, Atchison, Topeka & Santa Fe, Tipton, N. Mex., passenger train No. 2 was derailed, supposedly by a broken rail. The baggageman was injured.

o, 13th, Atchison, Topeka & Santa Fe, Nelson, Ariz., the locomotive of a passenger train was wrecked by the explosion of its boiler, and the engineman and fireman were killed.

bc, 16th, 4 a.m., St. Louis & San Francisco, Dublin, Texas, butting collision between a passenger train and a G. C. and S. F. freight, badly damaging both engines, and causing the death of a freight engineman and injuring one other trainman.

dn, 16th, Erie road, Newburg, Ohio, a passenger train was derailed at the derailing switch approaching the crossing of the Cleveland & Pittsburgh, and the engineman and fireman were injured, the former fatally. There was a dense fog at the time. A man walking on the track had been killed by the locomotive a moment before.

unf, 16th, 3 a.m., Alabama Great Southern, Moundville, Ala., passenger train No. 1 was derailed at a point where a rail had been maliciously removed, and broke through a trestle bridge; the whole train, except the engine and the rear car, fell into a creek. The express messenger was killed and two mail clerks and two passengers and three employees were injured.

bc, 17th, Erie road, Georgetown, Pa., butting collision of freight trains wrecking three engines and nine cars. One fireman was fatally injured.

bc, 17th, Pennsylvania road, Brownsville, Pa., butting collision of freight trains, wrecking both engines and several cars. One engineman was killed and six other trainmen were injured.

bc, 17th, Chicago, Burlington & Quincy, Table Rock, Neb., butting collision between a mixed train and a freight train. Four trainmen were injured.

17th, Baltimore & Ohio, Oakland, Md., a passenger train was derailed and two sleeping cars fell down a bank. Six passengers were injured, two of them fatally. It is said that the derailment was due to a broken rail.

unf, 17th, 1 a.m., Maine Central, Yarmouth Junction, Me., a passenger train was derailed at a landslide and several trainmen were injured.

unx, 17th, Houston & Texas Central, Dallas, Texas, a freight train was derailed and wrecked; three train men were injured, one of them fatally.

rc, 18th, 7 p.m., Pennsylvania Lines, Garfield, Ohio, a passenger train ran into the rear of a preceding freight, wrecking 11 freight cars. Two trainmen and one passenger were injured.

bc, 18th, 11 p.m., Pennsylvania road, Kane, Pa., a carload of lumber escaped control while being switched and ran some distance west on the main track to the foot of a grade, where it collided with an eastbound freight train. Two trainmen were killed and two others injured.

xc, 19th, 10 p.m., Central of New Jersey, Whitehouse, N. J., a westbound freight train, moving from a siding to the main track, was run into by another freight moving in the same direction, on the main line, and one engine and several cars were wrecked. Two trainmen were injured, one of them fatally.

unx, 19th, New York, Susquehanna & Western, Little Ferry, N. J., a car in a freight train was derailed and fell across the adjacent main track immediately in front of a passenger train, and the engine of the latter train was ditched. Two trainmen were killed and one passenger was injured.

o, 19th, Boston & Maine, Jefferson, Mass., the locomotive of a freight train was wrecked by the explosion of its boiler, and three trainmen were injured.

†rc, 20th, 8 p.m., Southern Pacific, Byron, Cal., the eastbound Los Angeles night express, having stopped to have a hot box cooled, was run into at the rear by a following passenger train and several cars were wrecked. Twenty-two passengers were killed and 21 were injured. The newspaper accounts, including interviews with officers of the road, indicate that the line of the road is straight and that the weather on Dec. 20 was clear, so that it is inexplicable how the engineman of the second train failed to see the red tail lights ahead of him; but the coroner's jury blamed the brakeman, the conductor and the *engineman* of the standing train.

xc, 21st, Norfolk & Western, Shawsville, Va., a freight train ascending a grade broke in two, and the rear portion ran back into the head of another train, which it met in a tunnel. The road was blocked 14 hours.

dn, 21st, Chicago, Burlington & Quincy, Lead, S. Dak., a freight train became uncontrollable on a descending grade and was derailed at a curve. Many cars were wrecked and one trainman was injured.

unx, 21st, Chicago Great Western, Skyburg, Minn., a freight train was derailed at a switch and 16 cars were ditched. A tramp was killed.

unx, 21st, 10 p.m., Missouri Pacific, Rantoul, Kan., passenger train No. 1 was derailed at a point where the roadbed is supposed to have been weakened by rain, and three passenger cars were overturned. The train was running at full speed, and after running off the track it took fire, in the mail car, but the flames were extinguished. Six persons were injured, most of them but slightly.

xc, 23d, 2 a.m., Cincinnati, Hamilton & Dayton, Liberty, Ind., butting collision between an empty engine running west backward, and an eastbound freight train, the empty engine having become uncontrollable because the engineman was unable to close the throttle. The shock of the collision detached the engine from its tender and reversed the reversing lever; and it immediately ran back eastward and collided with a freight. One fireman and one brakeman were killed.

o, 23d, Denver & Rio Grande, Buena Vista, Colo., the locomotive of a freight train was wrecked by the explosion of its boiler; the engineman was killed and two other trainmen were injured, one of them fatally.

rc, 24th, Pere Marquette, McCords, Mich., passenger train No. 32 just starting from the station was run into at the rear by passenger train No. 2; two passengers and two trainmen injured. Snow was falling rapidly at the time.

rc, 24th, 11 p.m., Pittsburgh, Ft. Wayne & Chicago, near Quaker Valley, Pa., the Pennsylvania Limited express train No. 5, ran into the rear of local passenger No. 137, crushing the rear car of the leading train and causing this car to telescope the one ahead of it practically its whole length. There was a blinding snow storm at the time and train No. 5 appears to have been running 50 or 60 miles an hour when it struck the preceding train, which was running at low speed. Notwithstanding the violence of the collision, the wheels were not knocked off the track and both trains ran 600 ft. before they were stopped. The cars of the leading train were nearly empty. The line of the road at this point is four-tracked, and is equipped with automatic block signals, the signals being on bridges above the tracks. The approach to the signal at the entrance of the block section in which the collision occurred is on a curve and the engineman of No. 5 took the signal for the westbound freight track instead of that for the track on which he was running. At the next signal back of this (which is the distant signal for the section in which the collision occurred) the engineman received a green (caution) indication. Six passengers on the accommodation train were injured, four very slightly. No one on the "Limited" was hurt. Five employees were injured, two trainmen on No. 137 and two trainmen and one operator deadheading on that train. No fatalities.

bc, 24th, 7 p.m., Colorado & Southern, Trinidad, Colo., butting collision of freight trains, wrecking both engines and several cars. Six trainmen were killed and two were injured. It is said that the conductor of the northbound train neglected to check the register at Trinidad, and thus forgot about the southbound train.

xc, 24th, 6 a.m., Illinois Central, Caneyville, Ky., collision between an eastbound passenger train and a work-train engine, making a bad wreck. One of the engines was wrecked and three cars were derailed. Three trainmen were killed and four were injured.

xc, 24th, Pennsylvania road, Fort Hill, Pa., collision between a passenger train and a freight, one passenger car being overturned. Two trainmen were injured.

xc, 24th, Kentucky & Indiana Bridge Co., Louisville, Ky., collision between a local passenger train, propelled by an electric motor, and a freight train of the Cleveland, Cincinnati, Chicago & St. Louis, due to misunderstanding of signals. One of the cars of the passenger train was knocked off the elevated structure on which the collision occurred and fell to the street below. Four passengers and two employees were injured.

bc, 25th, Chicago, Peoria & St. Louis, Peterberg, Ill., butting collision of freight trains, wrecking both engines and several cars. One fireman was killed and both enginemen were injured.

xc, 25th, Grand Trunk, Benton, Mich., butting collision between a westbound freight train and two empty engines, coupled together, backing eastward, these engines having been sent to the assistance of the freight train, which had become stalled on account of some difficulty with the engine. The three locomotives and several cars were wrecked. One engineman and one fireman were killed and two other trainmen were injured, probably fatally.

dn, 26th, 4 a.m., Cleveland, Cincinnati, Chicago & St. Louis, Edison, Ohio, eastbound passenger train No. 38 was derailed at a derailing switch while running at good speed; the momentum of the train was such that the leading engine struck a freight train passing on the transverse road and, with the second engine (behind it), was overturned.

xc, 27th, Northern Pacific, St. Cloud, Minn., rear collision of freight trains, wrecking the caboose and overturning several cars. One trainman and another man riding in the caboose were killed.

unx, 27th, 4 a.m., Cleveland & Pittsburgh, Akron, Ohio, a passenger train was derailed at a switch and the baggage car ran against some coal cars standing on a side track, making a bad wreck. One passenger car was overturned. Two passengers and two trainmen were injured.

unf, 28th, 11 p.m., Norfolk & Western, Greenville, Va., a passenger train was derailed and the engine and several cars fell down a bank. The train was running at full speed on a curve and it is said that a splice bar had been maliciously removed from the track.

rc, 29th, Baltimore & Ohio, Sterling, Ohio, the second section of passenger train No. 46 ran into the rear of the first section of the same train and wrecked one sleeping car. Two passengers were injured.

xc, 29th, Atchison, Topeka & Santa Fe, Siam, Cal., passenger train No. 7 ran over a misplaced switch and collided with a locomotive standing on a side track; two trainmen killed and one injured.

29th, Burlington road, Deadwood, S. Dak., a freight train ascending a grade broke in two and the rear portion ran back down grade several miles at high speed. At a sharp curve the cars were derailed and most of them fell over a precipice.

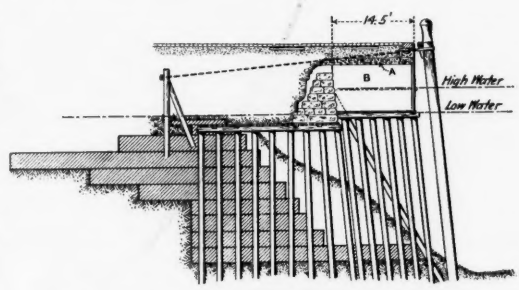
bc, 30th, Pennsylvania Lines, West Middlesex, Pa., butting collision between a passenger train and a freight, wrecking both engines. Two trainmen were killed and six trainmen and 10 passengers were injured.

dn, 30th, Chicago, Indianapolis & Louisville, Quincy, Ind., a freight train was derailed by running over a misplaced switch, and the engine and several cars fell down a bank. Three trainmen were injured.

Widening the Wilhelmina Quay at Rotterdam.

In a recent issue of the *Zeitschrift des Oesterr. Ingenieur-und Architekten-Vereins* are described the difficulties encountered in widening a quay wall in Rotterdam, Holland, known as the "Wilhelminakade." The wall was built on soft ground and the limited length of piles could not reach solid ground and thus offer resistance to the thrust of the retained earth. The method generally employed in the Netherlands in such cases consists in excavating the soft soil in the back of the wall and then building a dam by means of fascines up to about low water level. Piles are then driven through the same. The newly created foundation not only resists most of the lateral thrust but also compresses the soil and the piles get a better hold.

The above mentioned quay-wall was built in 1890-92, while the mattress dam was begun in 1885. The excavation for the fascines was 24.6 ft. deep and the wall extends for some 2,500 ft. The increase in size and weight of steamers during recent years made an increased depth at their landing a necessity. Since the local conditions did not allow of obtaining the increased depth by deepening the bottom without endangering the stability of the



Widening the Wilhelmina Quay at Rotterdam.

quay wall, it was decided to widen the wall towards the water front for 14¾ ft. To make the widened portion as light as possible, concrete steel supporting walls and slabs were used, the whole resting on piles, as shown in the accompanying engraving. The inclined piles are 9.8 ft. apart and butt at their upper ends against the old wall, which has been properly prepared for them. The foundation extends up to the low water level and on it concrete blocks are placed 3.28 ft. wide, 4.1 ft. high, and some 14.5 ft. long. The blocks are spaced 9.8 ft. centers and they are anchored back to the existing wall. They are indicated in the drawing by the letter B. Suitable recesses have been provided in the blocks for the inclined piles. Each concrete pier consists of two blocks, one on top of the other.

The open space left between the concrete piers, 6.56 ft. wide, is covered with slabs of concrete steel. The slabs are 8.86 ft. wide by 14.44 ft. long, and their thickness is 11 in. sloping down to 9 in. The slabs were made by using the foundation and the concrete piers for the erection of the forms. The concrete used was 1:4. Some of the slabs contained, on their lower side, parallel iron rods 0.35 in. in diameter, 2⅜ in. apart, and crosswise to them rods $^{5}/_{16}$ in. in diameter, 2¾ in. apart. The rest of the slabs had on the lower side iron rods ¾ in. in diameter and 7½ ft. long, with ends bent around hooklike; these were placed alternately 2¾ and 4¾ in. apart. Above and crosswise to them were laid rods ¼ in. in diameter. U-shaped wire rods .35 in. in diameter connect two upper and two lower rods. The heavier rods are in both cases laid in the direction of the longer span. Since the slab is supported on three sides and the fourth is unsupported the same was strengthened by an additional upper layer of iron bars. On the concrete slabs earth was laid and the wall finished to the required grade.

The second set of the above described slabs was tested

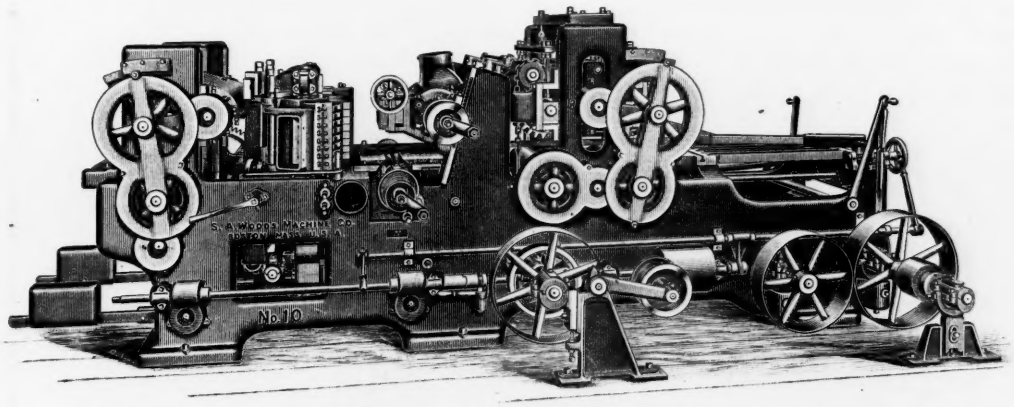
H. G. Prout.

and a load of 187,400 lbs. was sustained without injury. The corresponding load of 1,430 lbs. per sq. ft. is more than will ever be allowed on the wall, since the long supporting piles will not sustain any greater load.

Planer and Matcher for Thick Stock.

There has of late been an extraordinary demand for an extra heavy planer and matcher of modern type, something between the ordinary fast feed matcher and a large timber sizer. Such a machine has been needed to dress and match rapidly and perfectly, thick flooring, timbers, boards and other material used in car building.

Prominent among the characteristic features of the machine shown herewith is the patent adjustable wedge platen which permits of changing the cut or distributing it between the top and bottom cutter heads without either disturbing the top rolls or altering the finished thickness of the lumber. This feature also allows of instantly adjusting the machine for surfacing on one side only and with it scant sawed lumber may be made full dressed thickness. The adjustment is made from the feeding-in end, from which point the movable parts may be instantly locked in place after they are adjusted. The device resembles the table of a buzz planer, adjustable on inclines. The platen or bed plate under the top cutter head rests on an inclined casting which may be adjusted on wedges simultaneously with the lower feeding-in rolls, thus increasing or diminishing the cut.



A Planer and Matcher for Heavy Stock.

The adjustable chain device for driving the carrying stud gears attendant thereto. Patent knife setting gages, out rolls obviates the usual long train of gears and the which are adjustable to give the desired projection of the knife over the lip of the cutter head, permit the accurate setting of knives without measurements or the use of other instruments. Binding levers take the place of wrenches for locking the adjustable parts of the machine. The feed is arranged so that it may be operated from either end. Three distinct styles of feed can be furnished with this machine—that shown in the engraving, a friction clutch cone pulley feed, or a tight and loose pulley feed.

The bottom cutter head and its yoke are arranged to draw out by a screw, facilitating access to the knives. The patent system of applying pressure to the top feed rolls from below obviates overhead weights. The pressure bar or platen over the bottom cutter head acts as a gage for thickness of the finished stock and may be adjusted in a parallel plane, or either end may be disconnected from the hoisting mechanism and raised or lowered independently, all from the operating side.

Both the top and bottom cutter heads are double belted, the upper feeding in rolls are solid, although sectional rolls and expansion center guides may be applied if desired. There are six feed rolls, 9½ in. in diameter. The side chip breakers are sectional with shoes independently adjustable. The expansion gearing is properly covered and ample provision is made for taking away all shavings, etc. The machine is built to work 18 to 30 in. wide up to 12 in. thick.

It is made by the S. A. Woods Machine Company, South Boston, Mass.

Iowa Railroad Club.

At the December meeting of this Club, held at Des Moines on the 16th, the first business was the discussion of car service and the per diem rule. Mr. P. H. O'Connor, Train Despatcher of the Chicago, Milwaukee & St. Paul, at Perry, read a short paper. He said, in part: A great number of foreign cars are loaded at local points for local points. Train Despatchers or car distributors are unable to say from what foreign lines these cars are received or where they belong. This information must be obtained from the car accountant. I have adopted a rule on the divisions over which I have charge and find that it works satisfactorily. All agents are instructed that upon receiving a foreign car loaded, they will immediately wire me, giving number, initial of car and from what point received and if by way of some junction so state. If I am unable to give the billing of this car, I wire the car accountant, asking where the car belongs and by the time the car is unloaded, I am able to give the billing, thereby saving a delay and, possibly a per diem charge. This means greater mileage and increased revenue and no more cars stored on tracks waiting for home loading. Per diem is a premium on the prompt handling of foreign cars and a penalty on their delay.

Mr. Vermillion, commenting on the recent apparent increase in the number of collisions between passenger trains, said the number of collisions of late between passenger trains has been simply appalling. Railroad men naturally look for a preventive. Railroads of any magnitude whatever, as a rule, run eight or ten times as many freight trains as passenger trains. Still, the number of passenger train collisions is far in excess proportionately of freight train collisions. This I attribute to too much "one-man dependence" on passenger trains, or, in other words, conductors placing too much dependence on their engineers. Not that an engineer is not as reliable as his conductor, but the infallibility of any one man has never yet been established.

The passenger conductor gives his engineer the orders to meet a train at a certain point and then relieves his mind to a certain extent of the great responsibility, expecting his engineer to stop at the meeting point, and when the engineer forgets about stopping, the conductor discovers that he has made a great mistake in depending on an engineer he always thought perfect. On a freight train approaching a station, the engineer, after sounding station whistle, should immediately look back for a go-ahead signal from the rear of the train. If he did not get one he would stop the train and ascertain the cause. This rule is lived up to very strictly on a number of lines. On one or two lines the rule is that, when a passenger train receives a train order affecting its movement at any station, and when the engineer sounds the station whistle for that point, the conductor will at once pull bell cord or air whistle, notifying the engineer to remember his train orders respecting that station. An exchange of signals between the conductor and engineer should also take place when trains are meeting at their timetable meeting points without orders.

Mr. Stembel.—In theory this would be very good, but if actually carried out the engineer might be inclined to place too much reliance on having his attention called to his meeting points. The engineer is the logical man to carry the meeting points in mind, whereas the conductor has a great many duties to perform. I have considered this matter for some time, and in fact it was suggested at one time being put in operation on the Great Western, but it was finally decided that each Superintendent could adopt it or not on his division as he saw fit, if he considered it an additional safeguard. I decided that at present we would not care to put it into effect, simply for the reason that engineers might be inclined to place too much reliance upon having their attention called to their meeting points.

The rule of having a signal from the rear end of freight trains has been in effect on my division for a number of years and I consider it an excellent plan. Not necessarily so much to attract the attention of the engineer to not overlooking a meeting point, as to be sure that at every station an engineer will look back to see if his whole train is coming. Of course, as we get more cars equipped with air there will be less need of this, but I presume it will be several years before we shall have all air-brake cars. I think it very desirable for an engineer to look back at every station, if not oftener; and to insist that he receive a signal at every station, and further, I insist that the engineer acknowledge this signal.

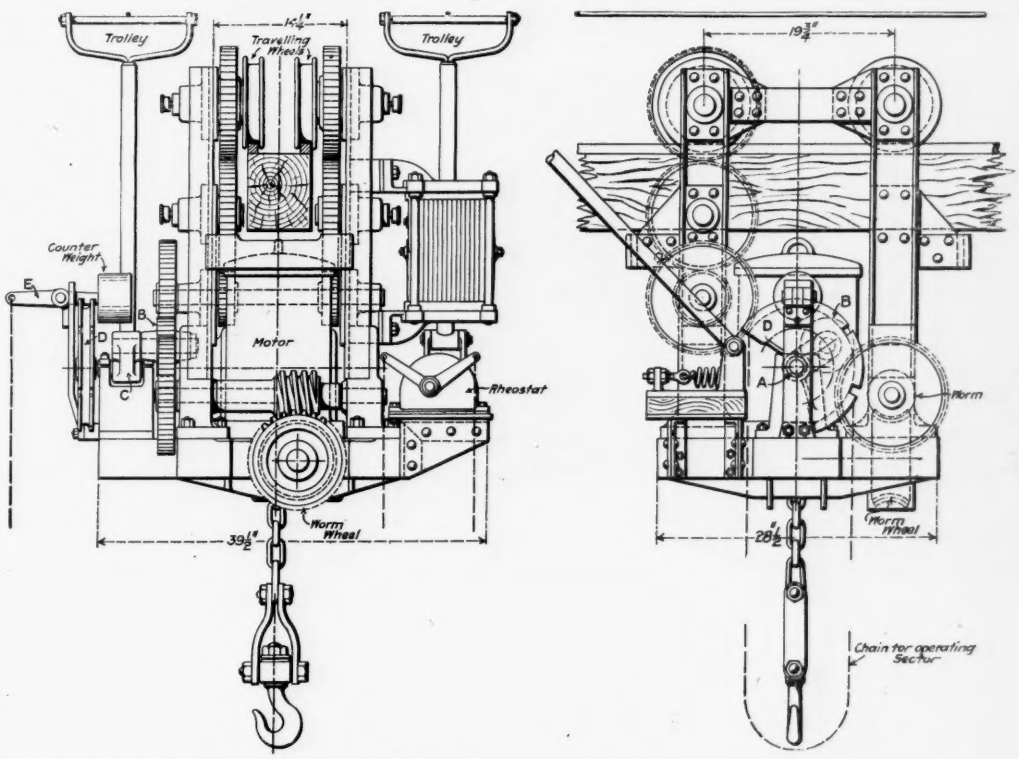
Light Electric Traveling Block.

Where the loads to be lifted or handled are comparatively light, and in places where space does not permit the use of a traveling crane a machine such as is shown herewith is useful. The device was designed by Mr. Rousselet, chief engineer of the firm of Postel-Vinay, Paris.

Referring to the illustration a single wooden or steel I-beam 7⅞ in. x 6¼ in. is suspended from the cross-beams or the roof, and is fitted with two iron rails of square iron bars on which the traveling wheels run. As the beams can be suspended in any shape, straight or curved, the block can be run from one shop to another.

The traveling wheels are four in number and run in bearings fastened to vertical channel beams 3½ in. x 2⅜ in. These beams are strongly joined together longitudinally and transversely as shown. A 220 volt motor is supported on the sole plate which is suspended between the four vertical channels. This motor is connected with two overhead electric cables by means of two trolley-rods, provided with long rollers instead of pulleys, so as to insure contact in places where the wires might be unevenly placed.

The motor is controlled by a rheostat worked from below by cords. By a simple ingenious device the motor can be put in connection either with the lifting or traveling gear. A cog-wheel *A* fixed on the motor-shaft is in permanent connection with another toothed wheel *B* running loosely on a pin on the free end of a lever *C* that can swing round a shaft on which a sector *D* is keyed. Over the sector a chain leading to the ground is fastened, thus enabling a man standing below to swing the sector and with it the lever arm *C* and toothed wheel *B* to either side and make connection with the lifting or traveling gear as desired. The periphery of the sector has three slots, into which a stop on a counterbalanced lever *E*, also in connection with the floor, can drop, maintaining the gear in position to either side and also in a neutral position, when the block is not in use.



Electric Traveling Block.

The lifting-gear is worked through a worm and worm-wheel. This dispenses with a brake, the load being unable to turn or reverse the worm. Lowering is done by reversing the motor. The traveling gear is worked through a direct wheel gearing on both sides of the supporting beams. All gears are machine cut.

The block as shown will lift a load of 1,000 kilogrammes (one ton) 9 ft., or run it along with a speed of about 180 ft. per minute.

RAILROAD GAZETTE

ESTABLISHED IN APRIL, 1856.
PUBLISHED EVERY FRIDAY
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EDITORIAL ANNOUNCEMENTS.

CONTRIBUTIONS.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

ADVERTISEMENTS.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and these only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.*

With this issue of the *Railroad Gazette* Mr. Henry G. Prout gives up the editorial charge which he has held one month short of sixteen years. During those sixteen years he has been the editor in fact, as well as in name. The proprietors have given him a free hand and cordial and loyal support. They have given him complete responsibility within his department and backed it with generous confidence. In those years he has been assisted by some twenty different associate editors, and by several regular editorial contributors. Among these have been some men of uncommon force, and several of extraordinary ability. Almost without exception these associates have served the journal with such zeal and fidelity as, looking back now over the years, seems to have been quite beyond the ordinary. A man could hardly have a better opportunity to do the kind of work that he might set out to do. Therefore, his success and his want of success in the work that has filled so many years is, to an unusual degree, his own. It is not for him to judge the measure of that success and want of success. His work of sixteen years can be summed up in a few words. First, it has been to treat the railroad calling as a profession, and to help to establish the principles and traditions of that profession. Second, it has been to help to clear railroad journalism from pedantry and pretentiousness, and to keep it in close touch with the best men in the actual work of the profession. Finally, the best personal reward that the Editor of the *Railroad Gazette* has found for sixteen years of fairly hard work, is in a multitude of interesting acquaintances and some dozens of close friends amongst the best men on earth. He leaves behind him the best editorial organization that this paper has ever had, and he hopes and believes that those who have worked with him and who succeed him will find the same pride and pleasure that he has always found in endeavoring to uphold the high traditions which Dunning and Forney established.

Returns from Electrified Steam Railroads.

The New York, New Haven & Hartford alone among the steam railroad corporations of the country has gone extensively into electric railroad operation and is still pursuing that policy. Counting electric roads that the company either owns outright or controls directly or indirectly, it now operates no less than 182 miles of single electric track. The trackage divides itself into three groups: (1) Separate and original trolley lines bought up or built to thwart electric competition over long distances, with a total trackage of about 88 miles; (2) former steam roads equipped by the trolley, with a trackage of about 57 miles, and (3) old steam roads equipped by third rail, with a trackage of about 37 miles. With the first of these groups, which falls into the class of ordinary trolley roads, we are not here concerned; but from the two last groups we are able to present some instructive and significant returns, most of them now published for the first time and taken directly from the books of the Consolidated Company.

The most interesting of the lines is that between Hartford and Bristol, Conn., a distance of about 18 miles, equipped with the third rail applied for the most part to an old steam road. It was opened in 1897 to New Britain and East Berlin; two or three years later extended to Bristol, and from the first has had to encounter for its whole distance acute trolley rivalry. It is operated between 5:30 a. m. and 11:50 p. m. by motor car, often with one or two trailers, and 36 of these "trains" daily in each direction—with some increase of service Sundays—and each train manned by a conductor and motorman. Excluding the East Berlin branch of three miles, which has a separate account, and taking the service for the 18 miles between Hartford and New Britain and Bristol, the returns for three years ending with Sept. 30, 1902, appear in the following table:

	Passengers carried.	Receipts.	Operating expenses.
1900	1,204,332	$141,987	$51,092
1901	1,239,725	146,473	43,233
1902	1,350,422	159,240	50,988
Total (3 years)	3,794,479	$447,700	$145,223

The remarkable showing of a little more than 32 per cent. in the ratio of operating expense to earnings becomes more so in contrast with the ratio of 64.76 per cent. of operating expense returned for all Connecticut trolley roads in the last report of the state railroad commission. But the operating expense of the third rail line is subject to some important modifications, which apply to all of the Consolidated Company's electrified roads. Electric lights, used at all stations on the lines, are deducted from operating expense; cost of maintaining electric roadways and stations is charged to the steam railroad account. Nor is any interest or depreciation on first cost included in the electric operations; and at all the power houses of the electrified roads locomotive "sparks" are largely used at a saving officially stated at 50 per cent. on fuel. "Maintenance of way and structures" cost last year, on the 4,005 single track miles of the Consolidated Company, $6,157,902, included in which such an item as dock and wharf expense of $114,601 and a large part of $1,109,031 charged to repair and renewal of buildings and fixtures manifestly do not apply to an electrified line. Allowing, however, the average annual charge on the system of about $1,500 a mile for maintenance of way and structures, the operation of the 18 miles of third rail Hartford-Bristol track would rise, even then, for the three years to only about 50 per cent. of passenger receipts—and this during a period of some losses from experimentation and not including early "novelty" travel. On the connecting East Berlin branch of three miles there are returns at hand only for the year ending Sept. 30, 1902. They show 339,921 passengers carried, receipts of $16,915 and operating expenses of $9,678, or about 57 per cent., which, with the addition for maintenance of way, would rise to almost 84 per cent.—a showing much less favorable. It should be added that it has lately been found necessary to equip anew the power house operating the whole of the foregoing system of 21 miles; but, on the other hand, the new power house may be used ere long to operate important projected extensions.

The Providence, Warren and Bristol system of about 35 miles electrified by trolley and competing with rival trolleys has been operated by the Consolidated Company for about two years, but the first year was broken by accidents which compelled a renewal of steam service. For the second year, ending Sept. 30, 1902, it returns 4,988,314 passengers carried, $252,788 receipts and $133,972 expenses, or 53 per cent. of gross earnings which, with the addition for maintenance of way, would rise to nearly 74 per cent. The service is 53 trains a day each way between 4:55 a. m. and 11:40 p. m. It is stated officially that since last September the passenger traffic on the line shows a great increase, but the returns are not here available.

On the Nantasket branch (Plymouth Division), with about 30 miles of single trackage operated for only a few months in the year, partly by trolley and partly by third rail, the following are the returns for three years ending Sept. 30, 1902:

	Passengers carried.	Receipts.	Operating expenses.
1900	1,134,035	$76,512	$53,017
1901	1,336,534	103,416	53,985
1902	1,016,403	60,465	42,395
Total	3,486,972	$240,393	$149,397

For the three years the returns thus show operating expenses of about 62 per cent., but, adding cost of maintenance of way, a loss for the three years of $40,000 a year is indicated, going to confirm the statement in this year's report of the Massachusetts Railroad Commissioners, who say in regard to the line: "The result of the more frequent service combined with lower fares was, at first, a large increase of business; but, more recently, the traffic has fallen off to such an extent that the company claims, apparently with reason, that this branch is unprofitable."

Last to be considered of the Consolidated Company's former steam roads electrified is the New Canaan branch from Stamford, Conn., to the borough of New Canaan—with 1,304 population—eight miles long, equipped by trolley, with no trolley competition and a line which may be taken as a short "cross country" type of electric road. Its returns for three years are annexed:

	Passengers carried.	Receipts.	Operating expenses.
1900	171,085	$16,771	$11,510
1901	198,492	19,790	12,520
1902	205,691	20,691	12,523
Total	575,268	$57,252	$36,553

The returns indicate for the three years about 64 per cent. of operating expense to receipts. Here again the application of the assumed charge for maintenance would show a loss for the three years of about $5,000. But, on the contrary, for such a line the charge should be the few hundred dollars a mile of other Connecticut "cross country" trolleys, and the line probably showed a fair profit. It may be said that, in the first year after the change from steam to electricity the passenger traffic of the branch rose from 98,302 to 184,728 with no change of fare.

In the final summary the five former steam roads of 94 miles single trackage electrified by the Consolidated Company show for the year ending Sept. 30, 1902, gross receipts of $510,099; operating expenses—subject to additions—of $249,556, or about 49 per cent.; and net earnings of $260,543. If the average cost of maintenance of way and structures on the whole consolidated railroad system of about $1,500 a mile were to be added, it would raise the operating expense about $141,000 to $390,556—about 77 per cent.—and reduce net earnings to about $120,000. But such a charge for maintenance is, as stated, decidedly excessive. Attacking the problem from another direction and applying to the 94 miles of electrified track the $4,506 average expense per mile for operating Connecticut trolley roads last year, we obtain $423,564 as a product and net profits of $87,535. In view of the less expense in operation of the electrified roads, especially in wages, the profit is probably greater, but whether enough to make a fair return on capital expended is uncertain.

On the whole, however, the excursion of the Consolidated Company into electricity on old steam roads seems to have been fairly successful. Earnings already of about $5,400 per mile compare pretty favorably with the average of $6,957 last year on Connecticut trolleys, only one of which, in spite of their greatly inflated capital, and debt, has thus far had to be reorganized. Except on the Nantasket branch, the passenger business steadily increases, and the item of depreciation cannot be great when a wealthy corporation sustains the plant. As a final, but most important consideration, the company has evidently been able to hold passenger traffic on lines which, if not electrified, must still have been maintained at a loss after the competing trolleys had attacked their passenger traffic.

December Accidents.

We publish in another column of this issue a condensed record of the principal train accidents which occurred in the United States in the month of December. The record contains accounts of 42 collisions, 26 derailments, and 3 other accidents. Those which were most serious, or are of special interest by reason of their causes or attending circumstances occurred as follows:

3d, Sunbright, Tenn.	23d, Liberty, Ind.
13th, Brookfield, Mo.	24th, Trinidad, Cal.
16th, Moundville, Ala.	24th, Quaker Valley, Pa.
17th, Oakland, Md.	25th, Benton, Mich.
†20th, Byron, Cal.	26th, Edison, Ohio.

The worst accident in December, that at Byron, Cal., has already been noticed in the *Railroad Gazette* (Jan. 2, page 10). There have been two or more verdicts by Coroner's juries, in different counties, but neither of those published is marked by much wisdom. One throws the whole of the responsibility on the men of the foremost train, except that the company is held responsible for not having had the block system in operation; and the jurors recommend that this system be "immediately extended to cover all stations" in their county. Whatever may be said about the responsibility of the men on the standing train, the fact remains that the line of the road is straight and level and the night was clear. An officer of the company tells a reporter that probably the engine-

man of the second train (the Stockton flyer) assumed that the standing train was at Byron station. The point where it actually was standing is 1,500 ft. short of the station, and it appears to be agreed that the flagman had gone back about 1,000 ft. At the time of the collision the train had been standing about seven minutes. One account says that the detention was due to leaky flues in the engine. The engineman of the Stockton flyer, when called to the witness stand, said that the windows of his cab were so covered with a film produced by the action of the atmosphere, combined with the high speed, that he did not have a good view ahead.

To those who wish to discuss technicalities this claim of the engineman affords a ground for more strongly emphasizing the rule that a flagman must go back the full distance and must put torpedoes on the rail the same in clear weather and on a straight line as in the densest fog on the most crooked line. An engineman who will not use his eyes must be appealed to through his ears; and, theoretically, this is practicable. But who is so innocent as to expect that more than one brakeman in 10 will go back 3,000 ft. when his flag or lantern can be clearly seen that distance without his moving a rod? The old standard rule required it, but nobody expected the requirement to be lived up to. The present standard rule tells the brakeman to go if necessary; with either rule, or both, the conclusive lesson of experience is that we shall continue to have collisions which will kill passengers by the score.

Perhaps the next in importance of the accidents in this month's record, though relatively unimportant when measured by the casualties, is the rear collision which occurred at Quaker Valley, Pa., on Christmas eve. Here the block system is used. The statement that an engineman entered an occupied block section, and completely wrecked a passenger car, because he did not know whether it was the right-hand or the left-hand of two signals, side by side, that he saw, is somewhat surprising. When it is considered that in this collision there were present all of the requisite conditions, except one, for killing 25 passengers, railroad officers will be curious to know whether such an explanation is to be readily accepted. On a four-track railroad, with the block signals for the two westbound tracks side by side and exactly alike, the most elementary theory of the operation and use of the signals would seem to demand that in each case the engineman shall see both signals. No cautious runner, we should imagine, would be satisfied, even on a straight line, to depend on either signal until he had seen both, particularly at night. This point takes on especial importance when the train is running at very high speed, because in that case there may be but a few seconds in which to read the signal, decide what action or non-action is requisite, and turn the attention to some other duty. Where the line is on a curve and when there is such a blinding snow storm that no dependence can be placed on the tail lights of the preceding train, to accept as conclusive the sight of a single lamp seems to indicate a very unusual habit of taking chances. The fact that in this case there was also a distant signal against train No. 5 only increases the perplexity of one who tries to find a rational explanation of the lapse.

In the collision at Trinidad, Colo., where six trainmen were killed, we come back to the time-interval and despatching system. Failure to look at the register, or to exercise the most calm and thoughtful care while reading it, accounts for some of the worst collisions. No better example can be found, than in this feature of the regulations, of the delicacy of the duties of conductors and enginemen under the despatching system, and the extreme difficulty of enforcing the rules, under the usual prevailing practice.

The worst railroad disaster in America during the month of December was the butting collision in Canada, which was reported in the *Railroad Gazette* of January 2, pages 10 and 15, and which, being outside the United States, does not appear in the present record. The report of the Coroner's inquest, given in our issue of January 9, page 35, appears to contain a correct statement of the facts, as far as it goes, although we have as yet no official confirmation of it. It appears that this collision, like that in California, occurred on a straight line, and would in all probability have been prevented except for the thick snow that was falling at the time. Canada furnished two other railroad accidents in December, one on December 6 at Belmont, Nova Scotia, in which six persons were killed, and one on the Victoria Bridge at Montreal, in which a freight conductor was killed and part of the wreck was burnt up. At Belmont a passenger train was derailed by the pilot of the locomotive becoming loose and falling on the track. The engine was overturned and fell down a bank. The line over the Victoria Bridge is equipped with automatic block signals. Mexico also figures in the December disasters, a special train carrying a thousand pilgrims having been wrecked, while running backwards, at Tepa, on the Hidalgo & North Eastern, December 11. Six passenger cars fell down a bank and three persons were killed. Many of the several hundred passengers, mostly women, were injured.

The number of electric car accidents reported in the newspapers of the United States for December was 11, in which three persons were killed and 57 injured.

The congestion of freight continues to be serious. It has been relieved in some places, as will be seen by the news item in another column, but many of the published statements give the impression that relief is effected at one city or on one division only at the expense of another city or division. Some railroad managers, whose troubles are comparatively light, seem inclined to doubt the accuracy of the reports that serious blockades have been raised. As, however, the sending of some locomotives from one division to another for a few days often seems to be the only way of breaking an obstinate blockade, it may well be that both the critics and those whom they criticise are right in their statements: the blockade is broken, but an increased blockade farther east may yet remain to be dealt with. To the newsgatherer the salient fact is that a clear and comprehensive view of the freight congestion is almost out of the question, owing to the immensity of the field and the constantly changing aspect of the situation. One might as well try to describe in words the character in detail of a ten-mile log-jam in the Androscoggin River. For much of the information about the freight situation the public is dependent on the Chicago reporters, and yet it seems quite clear that these enterprising headline artists have been a little too sweeping in their statements about the congested condition of the freight yards of the railroads leading eastward from that city. They have represented the embargoes (embraced in the notices which were sent by the Eastern roads to their Western connections) as very comprehensive. For two or three weeks the impression conveyed by the press despatches was quite clearly to the effect that all of the roads were refusing some freight, and that some of them had to refuse nearly everything except live stock. An officer of the New York Central, however, says that the Lake Shore has not at any time been compelled to refuse business, and that, while traffic is exceedingly heavy on the Central and the Lake Shore, there has not been any congestion. That the traffic is heavy, this officer shows by referring to the earnings of the New York Central for January, which amounted to $835,000 more than in the same month of 1902. On Wednesday, February 4, the New York Central moved 25,982 cars, which is said to be 500 cars greater than the best previous day's record.

At a conference of European railroads in St. Petersburg to consult as to through travel by way of the Siberian Railroad between Europe and China, the representative of the Chinese Eastern Railroad explained how it had been possible to carry the Minister of Finance from Moscow to Port Arthur in 12 days. In the first place there were only 10 passengers in the train, and in the next place a great number of mechanics, etc., were carried on the train, to make all necessary repairs without delay. It was questioned whether it would be advantageous, even if practicable, to run the cars through over the whole distance, some 6,500 miles; aside from repairs that may be needed, it will be almost impossible to keep the cars properly clean for so long a time. While the railroad is not in condition to make quick time, and will not be for some time, still before next summer it is expected to establish a regular through service, which will save most of the time required to go by sea from Europe to China. The plan now is to make considerable halts at the principal towns on the route, where passengers may leave the train, walk or drive about, etc.

Mr. Daniels, of the New York Central, announces that his road now serves meals by the card on all the dining-cars of the company except those on the Twentieth Century Limited and the Lake Shore Limited. He sends out samples of two handsome bills of fare; one showing a dinner costing a dollar, and the other showing a luncheon. The prices of the articles on the luncheon card appear to be very reasonable. Speaking of dining cars, Mr. Daniels, and the other enterprising passenger men among our readers, will, perhaps, be interested in a little novelty in this line which has just been reported by a correspondent writing from Tokyo, Japan, and an account of which will be found in another column. It is somewhat mortifying to have to admit that a new idea had its birth so far from America; but American railroads must have the best at all hazards, even if it be of Oriental origin, so we hasten to give this news to the world; and we shall look for the early appearance of agemaki coiffures among the ladies' maids on the Twentieth Century Limited.

NEW PUBLICATIONS.

A Treatise on Roads and Pavements. By Ira Osborn Baker, C. E., M. Am. Soc. C. E., Professor of Civil Engineering, University of Illinois. Published by John Wiley & Sons, New York, 1903. $5.

Considering the importance of roads and pavements from both the economic and the financial point of view, the professional literature of the subject, in permanent form, is comparatively meagre. The rapid advancement made in this branch of engineering in the last few years, and which continues to be made, makes the most recent books upon the subject desirable and valuable. A very considerable quantity of new data, some of it the result of careful original investigation by the author, is made available to the profession and the public through Prof. Baker's book, just issued from the press. The work is a notable addition to the literature of roads and pavements.

The treatment of the vexed question of the economic value of good country roads, while brief, is particularly full and complete. While an avowed friend of good roads, Prof. Baker evidently feels that the good cause is more likely to be injured than benefited by exaggerated claims and unverified statements of the financial and industrial benefits that follow the building of improved highways, and that in the end their promotion is sure to be conserved by the ascertainment and publication of the exact truth, as nearly as it is attainable. His conclusions will not, of course, meet the approval of those over-enthusiasts, not a few of whom would have us believe that the economic and social salvation of the country must come largely along improved highways. It may be confidently predicted that the moderate views presented by the author will in time be substantially confirmed and approved by the sober second thought of the best friends of the good roads movement.

Chapters one to six are mainly devoted to the location and construction of "Roads" as distinguished from "Pavements." The treatment of the subject is logical, and while concise, it embraces the latest theory and practice in sufficient detail to be considered a manual for the most advanced student of road building. Notable additions to our knowledge of the subject are the original investigations of the author into the subject of gravel as a material for road building, and some determinations of the tractive resistance of several kinds of roads and pavements made by the author. His determinations were, however, too few in number, and possibly not sufficiently accurate to entitle the results to full general acceptance. This is greatly to be regretted, since we have very little satisfactory data upon the tractive resistance of American pavements, and it is quite possible that the coefficients heretofore largely accepted, based mostly on unsatisfactory foreign determinations, are quite widely erroneous, when applied to modern pavements in this country. The chapter on "Equestrian Roads and Horse Race Tracks" will be welcomed by the engineer who may have occasion to lay out and construct roads of this kind. What has been written upon this subject previously is scattered through engineering and other periodicals, and not always readily accessible.

The author's treatment of the large subject of street pavement is logical in arrangement and terse and clear in diction, and embraces all the material facts available upon the subject. In addition to chapters on pavement economics, street design, street drainage, curbs and gutters, sidewalks and pavement foundations, a liberal chapter is devoted to each of the varieties of street pavement in common use. If a few technical errors have found their way into the text, they are practically unimportant. One noticeable feature of the book is the full and valuable data given upon the cost of the various kinds of roads and pavements. The careful engineer need not be misled by the fact that in a large number of the cost statements the items of interest, depreciation of plant, insurance, general superintendence, legitimate incidental expenses and contractor's profit are omitted. That it is quite unsafe to base estimates on the actual cost of *materials and labor alone* is, however, not so well recognized in practice as it should be. This is well illustrated in the very full statement of the cost of asphalt pavement given in the book, from which it appears that the cost of materials and labor constitutes less than 70 per cent. of the total cost, exclusive of contractor's profit. It is doubtless merely an oversight on the part of the author that a number of very careful, and doubtless, reliable, so far as they go, statements of cost, embracing the items of material and labor alone, should be designated as "Total Cost to the Contractor."

The chapter on the relative value and desirability of the several varieties of pavement and suggested methods of choosing for each locality and set of conditions, the pavement best suited to the purpose, is characterized by such a fair and judicial statement of the facts as should give weight to the conclusions reached. Perhaps the time may come when city authorities and urban citizens will pursue a similar logical course of reasoning in selecting for each street the pavement that will best meet the requirements under the conditions that exist.

The concluding chapter of the book is devoted to bicycle paths and race tracks. If it be true as believed by many that bicycle riding is in a state of decadence, this chapter will be less practically useful than the other portions of the work, but it may be yet welcome to many engineers.

As a whole, the book is a most creditable production and it cannot fail to add to the already high reputation of Prof. Baker, as a writer upon engineering subjects.

The Railway Signaling Club; Proceedings for 1902. New York. B. B. Adams, Secretary, 32 Park Place.

This volume of the Proceedings, a pamphlet of 100 pages, contains the papers presented at Chicago in March and May and at Pittsburgh in November, 1902, and the discussions thereon; together with the Constitution and By-Laws and a list of the members. The club now has nine committees. The names of the members of these committees and the subjects on which they are at work were given in the *Railroad Gazette* of Jan. 9. President H. C. Hope has sent out a circular offering to send copies of this report to railroad men and others interested in signaling, who are not members of the club. In this circular Mr. Hope says:

"The Railway Signaling Club is a railroad association of growing usefulness and increasing strength, and it merits the support and the interest of managing officers. The Club was started seven years ago, by Signal Engineers. It has a list of 300 members on 57 railroads, including all the large trunk lines in the Eastern, Central and Western States and Canada. All operating officers who are directly interested in either the maintenance of the operation of signals are eligible to membership and could do useful work by joining the Club. In particular, every division superintendent who is actively engaged in introducing fixed signals, either block or interlocking, or

in extending their use; or improving the discipline of his enginemen, as regards the observance of signals, should give his support to this association, both for his own benefit and for the promotion of good and uniform practice on all roads. Such officers can give much aid to the superintendent of signals or signal engineers by participating in their discussions.

"A general officer should not keep out of the Railway Signaling Club because he has many duties in other departments. Every operating officer who has experience in signals, or has definite views concerning the subject which ought to be spread, can do a good thing for the railroad profession by interesting himself in the Club work.

"The large increase in traffic makes it necessary for railroads to equip their roads with up-to-date signaling apparatus, both to insure safety and expedite traffic. This carries with it the necessity of a competent organization to investigate, experiment, and standardize apparatus. This is what the Railway Signaling Club has set about to do. The interchange of ideas at the meetings keeps members conversant with what is being done in other parts of the world, and broadens their views. Twelve regular committees of five members each are engaged on subjects embracing the principal questions before signal officers. . . ."

Rules of the Engineering Department, New York Central & Hudson River Railroad.—The revised edition (January, 1903) of the book of rules issued by Mr. W. J. Wilgus, then Chief Engineer (now Fifth Vice-President), is made more interesting by a diagram showing the organization. The diagram is carried out completely so as to show the direct relation and responsibility of every man above the rank of common laborer. In one respect the organization differs from many others: Wrecks are in charge of the Supervisor of the sub-division and of his superior officers in the engineering department. We are told that this system has worked well and economically for several years.

The literary quality of well-studied rules is always interesting. After years of revision and effort to make their exact meaning plain to all kinds of men, they become models of clearness and brevity. Naturally, the higher officers need, or are thought to need, much less instruction than those of less responsibility. For example, in this book the division engineer receives only 100 words of direction, while his supervisor of buildings has about 1,200 words; his supervisor of bridges, 2,000 words; supervisor of track, 2,200 words; and the foremen have 4,600 words. The instructions to the supervisor of signals are given in 750 words, while the inspectors and others under him have 4,100 words of hard reading. This is as it should be, probably, but the work-train conductor is let off with a sermon only 100 words long.

The Journal of the Iron and Steel Institute (British). Volume LXII. Edited by Bennett H. Brough, Secretary. New York: Spon & Chamberlain. 1903.

This volume contains complete reports on the Düsseldorf meeting, with the papers and discussions. It strikes us that the papers are singularly varied and interesting. It contains also the customary notes on the progress of iron and steel industries. These notes fill over 230 pages and are an excellent summing up of the year's history.

TRADE CATALOGUES.

The Vulcan Iron Works Co., of Toledo, Ohio, advertises its "Little Giant" traction wheel steam shovels and its "Giant C" 65-ton steam shovel, by means of a handsome calendar.

The North German Lloyd Docks at Hoboken.—The Joseph Dixon Crucible Co., of Jersey City, has issued a little pamphlet intended to describe the new piers of the North German Lloyd Company at Hoboken. The pamphlet is made up mostly of half-tones from photographs, showing pier No. 2 in various stages of building. There are a few words of description. The pamphlet was prepared as a souvenir of a visit to the pier by the members of the American Society of Civil Engineers at the time of the annual meeting of that society in New York.

The Steam Turbine—Its Commercial Aspect.—Westinghouse, Church, Kerr & Co. (8 and 10 Bridge street, New York City) have published in pamphlet form the paper by Mr. Sniffin which was read before the American Street Railway Association at Detroit, last October. In our issue of Oct. 24 a long extract from this paper was printed. The pamphlet may be obtained at any of the various offices of Westinghouse, Church, Kerr & Co. It gives a short history of the development of the steam turbine and some account of recent important installations and deals with its performance and efficiency in considerable detail. For anybody who has occasion to look carefully into this important phase of steam engineering the pamphlet will be valuable.

The Raymond Concrete Pile Co., Chicago, has issued a pamphlet describing and illustrating its system of concrete pile construction, descriptions of which have recently appeared in the *Railroad Gazette*. The methods, adaptability, cost, carrying capacity, etc., are explained and illustrated by engravings from line drawings. There are also a number of half-tone engravings, illustrating the operation of placing the piles, the appearance of the piles or concrete columns above ground after placing and before capping with a continuous monolithic concrete foundation, and of some large buildings built upon concrete piles. Other illustrations show the adaptation of the system to abutments, piers, docks, wharves, breakwaters, etc. The address of the Raymond Concrete Pile Co. is Merchants' Loan & Trust Bldg., Chicago.

The Care and Use of Pneumatic Tools is the subject of an eight-page pamphlet just issued by the Philadelphia Pneumatic Tool Co., of Philadelphia, Pa. A number of illustrations are used to make explanations clear and the book is useful. The same company sends also a six-page circular of illustrations and descriptions of Kellar pneumatic tampers for foundry work and for tamping concrete and clay.

Drop Forgings.—This is the title of J. H. Williams & Co.'s 1903 catalogue and price list of iron, steel, bronze, copper and aluminum drop forgings. It illustrates the Vulcan brand of drop-forged machine tools and specialties made by the company. The catalogue contains 94 pages 4½ x 7 in., and has several views of the works located at 9-31 Richards street and 1-29 Bowne street, Brooklyn, N. Y.

The Weir Frog Co., Cincinnati, Ohio, has embodied all its latest designs of frogs, switches, crossovers and switch-stands in the catalogue No. 6, dated 1903. Not all the specialties made by this company are shown, but there are a sufficient number to serve as a guide in the selection of all the necessary prices of built up work for any character of track. Complete instructions for ordering, and explanations of the various forms illustrated are included, together with numerous tables useful in estimating on new work and on repairs and renewals. An excellent index makes this compact volume a handy book for reference.

TECHNICAL.

Manufacturing and Business.

The second largest month's business in its history was done by the J. A. Fay & Egan Co., Cincinnati, Ohio, in January.

The Schuylkill Bridge Works, Stowe, Pa., is making an addition, 130 x 104 ft., and will also add a storeroom and toolhouse.

The American Blower Co., of Detroit, is building mechanical draft apparatus for several of the collieries of the Pennsylvania Coal Co., and for the Delaware & Hudson.

Messrs. Pettibone, Mulliken & Co., Chicago, will build a new plant to make railroad switches and frogs. The two buildings first to be built will be 280 x 700 ft., and 200 ft. x 280 ft.

The Gadsden Car, Foundry & Machine Co., Gadsden, Ala., has enlarged its foundry and boiler department and added new equipment, and has increased its capital stock to $50,000.

The Pressed Steel Tank Co., Milwaukee, Wis., reports orders from the Great Northern and the Chicago, Milwaukee & St. Paul roads for pressed steel tanks for use as air-brake reservoirs.

B. S. McClellan, for some time identified with the main office of the O. M. Edwards Co. at Syracuse, N. Y., has been appointed Western Manager, to succeed E. E. Silk. The change took effect Feb. 1.

The Railways Improvements Co., with principal office at 15 Exchange Place, Jersey City, N. J., has been incorporated under the laws of New Jersey by Louis B. Dailey and others to make railroad equipment.

John W. Grove and L. H. Knox have formed a co-partnership under the name of Grove & Knox, to do all kinds of furnace engineering and contracting, and to act as selling agents for manufacturers of iron and steel castings. The office is in the People's Bank Building, Pittsburgh.

Charles D. Seeberger, the originator of the escalator system, has gone to England to complete arrangements for installing escalators in the stations of one of the London underground railroads, the preliminary negotiations having been conducted by the Waygood-Otis Company of that city.

F. R. Phillips & Sons Co., of Philadelphia, have a contract for the engineering and equipment of a large modern foundry in Europe (contractors decline to be more definite than this), to be built on American lines throughout. It will be used to make heavy machinery, chilled rolls, etc.

Fire destroyed the plant of the Railway Supply Foundry Co., Chicago, on Feb. 2. The plant was located at Harvey, Ill., and it is said that the loss is covered by insurance. The company has made arrangements to continue filling its orders while the plant is rebuilding, so that no delay will be occasioned.

The Magnolia Metal Co., 511 West 13th street, New York city, is offering for sale $200,000 of 7 per cent. preferred stock. The proceeds are to be used as working capital. The company makes a number of grades of bearing metal and intends to produce casting metals for typesetting machines and other purposes.

At a meeting of the Board of Directors of the Union Switch & Signal Co., held at Swissvale, Pa., Feb. 9, the annual report for the year ending Dec. 31, 1902, was approved and ordered printed, and sent to the stockholders. The transfer books were ordered closed from March 1 to March 10, inclusive, for the purposes of the annual meeting, to be held on the later date. H. G. Prout, of New York, was elected First Vice-President and General Manager of the company, E. H. Goodman, Second Vice-President, having resigned as General Manager. The growth of the company's business makes the addition of Mr. Prout to the staff of the company desirable, and the division of duties between Mr. Prout and Mr. Goodman will be of great importance in the management of the business.

Iron and Steel.

Lewis Hazelins Taylor, President of the Taylor Iron & Steel Co., High Bridge, N. J., celebrated his 92nd birthday about two weeks ago. He has been President of the Taylor Iron & Steel Co. since its incorporation in 1869.

The National Iron & Nickel Corporation has been incorporated in Toronto, with an authorized capital of $5,000,000. The provisional directors are H. R. Frankland, L. E. Hambly and others, of Toronto, and W. A. Everett, of Duluth, Minn. The office is in Toronto.

The steel industry of Ontario increased nearly 500 per cent. in a year. In 1901 the production amounted to only 14,471 tons, valued at $347,280, while last year 68,802 tons were produced, worth $1,610,031. The pig-iron industry, however, shows a slight decrease. In 1902 112,687 tons were produced valued at $1,683,051, as compared with 116,370 tons, worth $1,701,707 in 1901.

Interlocking.

The Pneumatic Signal Company, of New York, Rochester & Troy, has contracted with the Great Northern to put in for the road an interlocking plant at Grand Forks, British Columbia.

Car Ferries for the Pere Marquette.

According to despatches from Cleveland, the Pere Marquette Ry. has ordered from the American Shipbuilding Co. two car ferry steamers, to cost about $750,000. The boats will be duplicates of those now in use and are to run between Ludington and Milwaukee.

To Remove a Bridge Building Plant.

The Empire Bridge Co., which operates the bridge building concerns in New York State owned by the American Bridge Co., is considering the removal of the plant on Bridge street, Albany, to Breaker Island, in the Hudson River, near Troy, where there is an old steel plant which has recently been bought by the corporation.

To Build Cars in Mexico.

The contract between the Government of Mexico and Isaac M. Hutchison, giving the latter a concession for erecting car building shops in the Republic, is published in the Mexican City *Herald* of Jan. 26. The concession, which is extensive in its provisions, is signed by Leandro Fernandez, Secretary of the State of Fomento, and P. M. Armendariz, as representative of Mr. Hutchison, but it does not give the address of the latter. At least $100,000 must be spent within 10 years on shops and warehouses.

Another Bridge Building Company.

The Cooper, Wigand & Cooke Co. has filed articles of incorporation at the County Clerk's office in Passaic, N. J., with the intention of engaging in making structural steel and building bridges. The capital stock is $400,000, and the company expects to begin business May 1. The officers are John Cooper, of New York, President; John K. Cooke, Paterson, N. J., Vice-President; A. A. Wigand, New York, Secretary and Treasurer, and O. W. Cooke, Paterson, General Manager. Messrs. John K. and O. W. Cooke are at present with the Passaic Rolling Mills Co., but have resigned, the resignations to take effect April 1.

Water Softening Plant.

The Buffalo, Rochester & Pittsburgh has let a contract for a water softening plant to be erected at Punxsutawney, Pa., by the Pittsburgh Filter Manufacturing Company, of Pittsburgh, Pa. The plant will have a capacity of purifying 350,000 gallons of water in 24 hours, and consists of two 65,000 gallon tanks. While the water in one tank is undergoing treatment, the other tank is being emptied into a standard tank on the line of the road. It is the intention to give this a thorough trial and if successful other plants will be erected along the line. This same system is now in operation at the water station at Groveland on the Delaware, Lackawanna & Western, and reports are that it is being run very successfully.

Revision of Rules of Interchange.

A notice to members of the Master Car Builders' Association advises that the Arbitration Committee would be glad to receive from the members such suggestions as they may have to make for revision of the Rules of Interchange. These suggestions should be in the office of Secretary J. W. Taylor, 667 The Rookery, Chicago, not later than April 1.

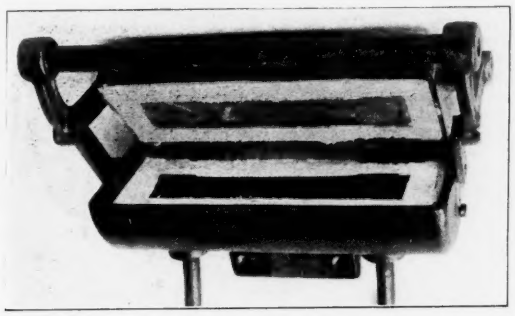
Pneumatic Tool Litigation.

In October last Judge Lacombe, United States Court for the Southern District of New York, enjoined the Philadelphia Pneumatic Tool Co. from making, selling or using a drill declared to be an infringement of the Moffet patent controlled by the Chicago Pneumatic Tool Co. On Feb. 4, Judge Lacombe suspended the injunction against the Philadelphia Pneumatic Tool Co. "until after hearing and decision of appeal in cause now pending in Circuit Court of Appeals." The hearing referred is appointed to be held on Feb. 24. Judge Lacombe, in suspending

the injunction, gave the Philadelphia Pneumatic Tool Co. the right to move to dismiss the suit "if complainant's *prima facie* proofs be not completed within 30 days."

Fuse Box for Street Car Motors.

Perhaps the best appliance for protecting a street car equipment from too great overloads is the automatic circuit-breaker, serving, also, as a canopy switch when installed within easy reach of the motorman. The great advantage of this arrangement is that it is easily accessible, can be quickly closed and is in no way dangerous, thus avoiding the usual delay and risk incident to replacing a fuse. Where it is not thought advisable to incur the expense of equipping all the cars of a line with automatic circuit-breakers, the next best thing is a fuse



block possessing the same qualities of accessibility and freedom from danger. The fuse block shown in the accompanying illustration can be easily gotten at for renewing the fuse and, when open, the contacts on which the fuse is supported are cut out of the circuit, making it perfectly safe to replace the fuse while the line is alive. A straight piece of copper wire is used as a fuse and is secured in place and clamped in the contacts by the act of closing the block. When a fuse blows, all that is necessary is to open the block, drop a piece of straight copper wire in place, and then close it again. The fuse block shown herewith, which is made by the Westinghouse Electric & Manufacturing Company, is iron clad, being completely enclosed in an iron casing, excepting where the vent for the arc extends through the bottom.

Sewage Pumping Station for Washington.

The Commissioners of the District of Columbia last week let contract to Ambrose B. Stannard, of New York, for building the foundation work and building for the new sewage pumping station at the foot of New Jersey avenue, S. E. The total contract price is $548,220, of which $269,220 is for the foundation and $277,000 is for the building.

New Steel Company in Colorado.

The Frontier Coal & Steel Co. has been incorporated at Denver, Colo., with a capitalization of $1,000,000, which later will be increased to $15,000,000. David H. Moffatt and other Denver capitalists are interested. The company will erect a large steel plant at Denver. For the present the company will obtain its ore from Wyoming, but when the new railroad being built by Mr. Moffatt reaches Routt County the company will secure both its ore and coal from that section, where it owns large tracts of iron and coal property.

The Fisher Pump Governor.

The Fisher pump governor, which has been on the market for 15 years, bases its primary claim to advantage upon its simplicity of construction; as a result of which it is further claimed that it cannot get out of order. The valves and seats are made of the best phosphor-bronze and all pipe work is of brass in conformity to the rules and regulations of the Fire Underwriters Association. Once set, it works entirely automatically, regulating the steam consumption so that only an amount sufficient to maintain the required pressure in the mains is used. Over-pressure in the mains, and consequent bursting of mains or hose, is prevented, and there is also a saving of the engineer's time since the pump does not require his attention. The governors are adapted for use on water works pumps, hydraulic elevators, boiler feed pumps and all pumps working under pressure. The Fisher Governor Co. is at Marshalltown, Iowa.

Cast-Iron Wheels.

The Master Car Builders' Association Committee on Cast-Iron Wheels has set out a circular of inquiry requesting the following information, suggested in the report at Saratoga, in 1902, to enable it to complete its report on the design and minimum weight for cast-iron wheels for 60,000, 80,000 and 100,000 lbs. capacity cars. A record is desired of all cases of breakage of wheels, giving: (1) Weight of wheel, (2) capacity of car, (3) character of breakage, (4) track circumstances as far as the grade is concerned; that is, whether the breakage occurred on a grade or near the terminus of a grade of given length.

If any grades are found specially troublesome, a plan showing profile and curvature would be especially valuable. The terms descriptive of breakages should conform, so far as possible, with the terms adopted by this association. In addition to the above information the committee particularly desires information relating to the hub dimensions, thickness of plates, size of ring core and contour lines of such wheels as are now in service and are giving the best success under cars of 60,000, 80,000 and 10,000 lbs. capacity. A sketch will be furnished on application, with designating letters, to more clearly show the dimensions that are required, and each member is requested to break at least one wheel of each class that is found to give entire satisfaction under all conditions for their respective weights of car and fill in the dimensions of the broken wheel on the attached sketch (if a complete drawing of the wheel cannot be furnished). Replies should be sent not later than March 15, 1903, to William Garstang, Chairman, Supt. M. P., C. C. C. & St. L. Ry. Co., Indianapolis, Ind.

THE SCRAP HEAP.

Notes.

The Car Record Department of the Wabash road has adopted McNamara's system of graphic records.

Reports from St. Louis say that the Missouri, Kansas & Texas has agreed to increase the pay of passenger trainmen 12 per cent. and freight trainmen 15 per cent. These figures are given out by the Brotherhood leaders, not by the railroad company; and it is claimed that all of the other important Southwestern roads are disposed to follow the example of the M., K. & T.

Since the collision of Jan. 27 there has been considerable talk in New Jersey in favor of the establishment of a State Railroad Commission. Of the public men interviewed on the subject, nearly or quite all express general approval of the idea, but no very definite reasons are given on either side of the question, except that ex-Governor Griggs calls attention to his advocacy of the project in 1897 and 1898.

The action of the Senate at Washington in corporation and trust matters, as reported last week, was followed on Saturday by the passage in the House of the Littlefield anti-trust bill; so that interest now centers on the fate of the rival bills—those which originated in the Senate and the Littlefield bill, originating in the House—in the conference committee, which probably will have to settle what action Congress finally takes. The Littlefield bill aims to secure publicity of the affairs of corporations, including manufacturing and mercantile concerns, by having reports made to the Interstate Commerce Commission, and there is a clause prohibiting carriers from knowingly transporting articles produced, manufactured or sold in violation of the Sherman law of 1890. In the committee discussions on the bill for the establishment of a department of commerce the provision for putting the Interstate Commerce Commission into that department appears to have been stricken out; or, at any rate, the committee has so voted.

Pittsburgh papers announce that the embargoes which have been in effect on the Pennsylvania Lines West of Pittsburgh for several weeks have been lifted. The Baltimore & Ohio has also revoked the embargo on shipments to Baltimore, and press despatches indicate that the congestion on B. & O. lines is being somewhat relieved in other directions also. Chicago despatches of Monday last indicate, however, that there is still great pressure from all points that usually ship large quantities of eastbound freight. One statement says: "The Pennsylvania did not move a car of grain out of Chicago for four days last week. It has issued a fresh embargo, refusing to take anything but perishable freight in carloads for points east of Johnstown, Pa., but will take local tonnage for destinations west of Pittsburgh and Johnstown. Officials say that they have made no headway of late; they have too much business and find it necessary to put on a fresh embargo. The Lake Shore and the Michigan Central are in the best condition of any of the Eastern roads. The Lake Shore is receiving all classes of freight except grain for transfer locally. The Michigan Central is said to be ferrying 1,400 cars a day at Detroit. The Grand Trunk and the Wabash are said to have 3,000 cars held up between Detroit and Chicago and 1,800 more between Windsor and Niagara Falls."

Manhattan Elevated (New York).

This company carried 64,822,675 passengers for the quarter ending Dec. 31, 1902, as against 57,225,850 in the same quarter of 1901, an average daily increase of 82,464. The total receipts increased $374,224, while the operating expenses decreased $49,335.

The Railroad from Suakim to the Nile.

In a speech at Khartoum Jan. 29 the Earl of Cromer announced the intention of the government to begin as soon as possible the building of a railroad from Khartoum to Suakim. Many years ago Major Prout (later Colonel) after a careful reconnaissance of the route made a report to the Khedive urging that a railroad be built from Suakim on the Red Sea, across the desert 240 or 250 miles, to Berber on the Nile. His report was printed in Arabic and English at the War Office at Cairo, and early in the days of the Mahdi's rebellion a condensed plan and profile of his route appeared in *Engineering News*. After the desert was occupied by hostile and active Arabs the British started the railroad from Suakim and also a pipe line for water, and bought pumps from Worthington. The job was a little too tough and was given up. It is merely a question of time when the railroad is built, as anyone can see by looking at a map of the situation. It is an obvious gateway to the Soudan.

The United States Steel Corporation Sustained.

The New Jersey Court of Errors and Appeals on Feb. 4 gave a decision in favor of the United States Steel Corporation in an appeal from the injunction granted by Vice Chancellor Emery. This injunction, which is now set aside, restrained the Corporation from carrying out their plan of converting $200,000,000 seven per cent. preferred stock into 5 per cent. bonds, and was granted in the suit brought by J. Aspinall Hodge. The complainants laid particular stress upon the large profits which were to be made out of the bonds issued by J. P. Morgan & Co., and they further declared that the Steel Corporation had not complied with the statute of the New Jersey Legislature of March 28, 1902, in that they had not "continuously declared and paid dividends" at a rate exceeding 5 per cent. on the preferred stock for at least a year preceding the stockholders' meeting, when the conversion was authorized. Complaint was also made that the assets of the company, after deducting the amount of the indebtedness, were not equal to the amount of its preferred stock issued and outstanding; the Directors of the Corporation were financially interested in the ratification of the plan and were to divide a large commission, on its consummation; and that the execution of the plan would discriminate inequitably against certain stockholders, etc.

It is now thought likely that the conversion plan will be proceeded with at once. If it is put into effect in accordance with the plan of last year, preferred stockholders will have the right to convert 40 per cent. of their holdings into 5 per cent. bonds, and will be allowed to subscribe at par for new bonds to the extent of 20 per cent. of their holdings. The decision has had the effect of advancing the market prices for these stocks, both common and preferred.

Ruskin's Influence in Korea.

The Korean Government seems to have been reading Ruskin's works lately, for it has protested against the spoiling of the view from the late Emperor's tomb near the Chichi-Ken hills, by the Seoul-Fusan Railroad. As the Korean Government is practically of no account, however, in Korea, the work is progressing just as if no protest at all had been made. The section from Eitoho to Meikakudo (in the direction of Seoul) is already completed, and the section between Anyo and Shinsi, 23 miles, is expected to be completed in June next. There are 350 Japanese and about 3,000 Korean coolies now working on the line, which promises to be one of the greatest enterprises ever undertaken for the opening up of Korea and especially for the extension of Japanese influence therein, inasmuch as it will permit of an enormous number of Japanese settling down in the rich but thinly populated land at an easy distance from the coast.

New Vessels for the Navy.

The Navy Department let contracts on Feb. 3 for the armored cruisers "Tennessee" and "Washington," one going to William Cramp & Sons, of Philadelphia, at their bid of $4,035,000, provided the Government plans are used; and the other to the New York Shipbuilding Company, of Camden, N. J., at the same price.

The Naval Board on Construction has decided upon a model for the gunboats "Paducah" and "Dubuque," authorized by Congress last session. These ships will be of 1,080 tons displacement and 10 knots speed, and will carry six 4-in. guns of the new type, making a more formidable battery than previous ships of this class have had.

The Sundry Civil Appropriation Bill.

The Appropriations Committee of the House of Representatives last week reported the Sundry Civil bill which carries a total of $78,007,929, or $8,886,432 less than the estimates and $17,355,871 more than the appropriations for the current year. Among the more important items for which increased amounts are provided are: For the improvement of river and harbors under continuing contracts authorized in previous river and harbor acts, $20,233,151, an increase of $14,464,393; for public buildings already authorized, $10,429,413, an increase of $923,817; for the Interstate Commerce Commission, $325,000, an increase of $15,000 in the item for the expenditures in connection with the safety appliance Act; for the lighthouse service, $3,824,000, an increase of $118,987; for the Coast and Geodetic Survey, $959,520, an increase of $131,000, of which $120,000 is for a new vessel.

The Naval Appropriation Bill.

The Naval appropriation bill as reported to the House of Representatives carries a total of $79,048,420 against total estimates by the Navy Department of $85,155,510. The bill authorizes three first-class battleships with the best armor and most powerful armament for vessels of that class, and with 16,000 tons displacement and highest practicable speed, to cost exclusive of armor $4,212,000 each; one first-class armored cruiser of not over 14,500 tons displacement to cost not over $4,659,000, exclusive of armor; two steel sailing ships for training purposes to cost $370,000 each, and one wooden training ship to cost $50,000. The amount authorized for the new buildings at the Naval Academy is increased from $8,000,000 to $10,000,000, and $400,000 is appropriated for a post-graduate school at Annapolis with experimental plant and testing laboratory for engineers for experimental work with boilers; the school to be similar to the one at Charlottenburg, Germany. Provision is made for doubling the number of cadets at the Naval Academy and additional officers are provided for in all grades from lieutenant commander down. For a Naval training station on the lakes $250,000 is provided.

Gross Earnings Since 1894.

The *Commercial and Financial Chronicle* gives the following tabulation of gross earnings compiled from returns from practically all the railroads in the country from 1894 through 1902, showing the steady increases.

Jan. 1. to Dec. 31.	Mileage reporting.	Earnings.	Earnings per mile.
1894 (186 roads).....	145,897	$826,599,690	$5,665
1895 (195 roads).....	143,052	842,460,397	5,889
1896 (196 roads).....	148,916	879,622,029	5,907
1897 (192 roads).....	154,930	974,466,753	6,290
1898 (190 roads).....	157,801	1,050,895,038	6,659
1899 (168 roads).....	156,958	1,128,928,916	7,191
1900 (171 roads).....	157,401	1,216,924,951	7,731
1901 (157 roads).....	170,549	1,495,915,406	8,771
1902 (147 roads).....	170,395	1,542,725,832	9,053

The Wabash in Pittsburgh.

The Pittsburgh Common Council has passed the ordinance permitting the Pittsburgh, Carnegie & Western line of the Wabash to enter that city. The franchise had been "held up" by the council for some time and all work was stopped when the Pennsylvania Supreme Court gave a decision unfavorable to the Wabash, several weeks ago. Bids for the passenger station at Liberty and Ferry streets were at once asked by President Ramsey, and instructions were issued to the railroad contractors to take up their work where it had been left off. It is expected that work on this line will be completed by next summer, and that the links connecting with the West Virginia Central & Pittsburgh and the Western Maryland will be ready at the same time.

LOCOMOTIVE BUILDING.

The Kolimari R. R. (*Japan*) has ordered eight locomotives from the Baldwin Works.

The Nevada, California & Oregon is having two locomotives built at the Baldwin Works.

W. R. Grace & Co., New York city, is having one locomotive built at the Rogers Locomotive Works.

The Baltimore & Ohio is having three locomotives built at the Pittsburgh Works of the American Locomotive Co.

F. M. Hicks, of the Hicks Locomotive & Car Works, has received an order for one locomotive from the Columbia Lead Company.

The South Buffalo Ry. has ordered two six-wheel switching and two consolidation locomotives from the Baldwin Works. The consolidation locomotives will weigh 175,000 lbs., with 159,000 lbs. on the drivers, and have 21 x 30 in. cylinders, 56-in. drivers, Vanderbilt boiler, with a working steam pressure of 190 lbs.; 377 tubes, 2 in. in diameter, 12 ft. ½ in. long; fire-box, 11 ft. in length, and having a diameter of 63½ in.; tank capacity, 4,000 gal. of water. The six-wheel switching locomotives will weigh 116,040 lbs. on the drivers, with 20 x 26 in. cylinders, 50-in. drivers and a working steam pressure of 180 lbs.; 270 tubes, 2 in. in diameter and 10 ft. 11¾ in. long; fire-box, 103⅛ in. x 33¼ in.; tank capacity, 4,000 gal. of water. Special equipment for both will include Westinghouse American air-brakes, M. C. B. couplers and two headlights.

The Illinois Central has ordered 20 simple consolidation and five simple Atlantic type locomotives from the Rogers Locomotive Works, for December delivery. The consolidation locomotives will weigh 188,000 lbs., with 163,000 lbs. on the drivers, and have 20 x 28 in. cylinders, 56½ in. drivers, and extended wagon top radial stay boilers, with a working steam pressure of 200 lbs.; heating surface, 2,702 sq. ft.; 335 National Tube Works Illinois Central special tubes, 2 in. in diameter, 14 ft. 7⅝ in. long; carbon or Otis steel fire-box, 108 in. long and 72 in. wide; grate area, 54 sq. ft.; tank capacity, 7,000 gallons of water and 15 tons of coal. The Atlantic type locomotives will weigh 178,600 lbs., with 95,710 lbs. on the drivers, and have 20 x 28 in. cylinders, 79 in. drivers, extended wagon top radial stay boilers, with a working steam pressure of 200 lbs.; heating surface, 3,129 sq. ft.; 355 National Tube Works Illinois Central special tubes, 2 in. in diameter, 16 ft. 10¾ in. long; Otis steel fire-box, 102 in. long and 72 in. wide; grate area, 51 sq. ft.; tank capacity, 7,000 gallons of water and 15 tons of coal. The special equipment for both types will include: Taylor iron axles, Lappin brake-shoes, American Steel Casting Co.'s couplers, Illinois Central standard headlights, Ohio and Simplex injectors, Cicero bronze journal bearings, U. S. or Jerome piston and valve rod packings, Ashton safety valves, Leach double sanding devices, Nathan sight-feed lubricators, American Railway Steel Spring Co.'s springs, Ashton steam gages, Midvale and Latrobe truck and tender wheel tires.

CAR BUILDING.

The General Electric is having four freights built at Berwick, Pa.

The American Car & Foundry Co. has miscellaneous orders for 20 cars.

The Salt Lake & Suburban is in the market for seven passenger cars and 40 freights.

The Louisville, Henderson & St. Louis has ordered two coaches from the American Car & Foundry Co.

The Pennsylvania has ordered 500 gondolas, 50,000 lbs. capacity, from the American Car & Foundry Co.

The Canadian Northern has placed an order for 30 freight cabooses at its own shops, Winnipeg, Man.

The Michigan Central has ordered three combination baggage and express cars from the Pullman Company.

The Boston & Albany is having five freights built at the Berwick Works of the American Car & Foundry Co.

The New York, Coal & Transportation Co. is having 50 freights built at the Pressed Steel Car Works, Allegheny, Pa.

The Union R. R. (Pittsburgh) is having 1,000 freights built at the McKees Rocks plant of the Pressed Steel Car Co.

The Buffalo, Rochester & Pittsburgh is having 500 freights built at the Berwick Works of the American Car & Foundry Co. This is the same order as that reported in our issue of Jan. 16.

The Nashville, Chattanooga & St. Louis has ordered six coaches from the Pullman Company, and is also building 500 miscellaneous freight cars at its own shops.

The Cold Blast Transportation Co. contemplates building 100 beef cars of 60,000 lbs. capacity at its own shops. The cars will be their standard 34 ft. cars, with all modern appliances.

F. M. Hicks, of the Hicks Locomotive & Car Works, has received orders for the following cars: Boca & Loyalton, one combination passenger and baggage car; Union Stock Yards Co., Omaha, three gondolas; Goble, Nehalem & Pacific, five flat cars of 50,000 lbs. capacity; Santa Fe Central, 25 flat cars.

The Bellingham Bay & British Columbia is building 100 box cars of 60,000 lbs. capacity at its Whatcom, Wash., shops, for March delivery. The cars will be 36 ft. long, 8 ft. 5 in. wide and 8 ft. 6 in. high, all inside measurements, to be built of wood, with wooden underframes. The special equipment includes: Common Sense boisters, Westinghouse air-brakes, American Car & Foundry Co.'s brasses, Major couplers, Miner draft rigging, Washington fir roofs, American Car & Foundry Co.'s trucks and Griffin Wheel Co.'s wheels. Other specialties are: Truck frames with all malleable iron castings by American Car & Foundry Co.

The Chicago Great Western has ordered 500 box cars of 70,000 lbs. capacity, 100 stock and 100 furniture cars of 60,000 lbs. capacity from the Pullman Co.; and 26 cabooses from the American Car & Foundry Co., all for June delivery. The box cars will weigh 32,000 lbs., and measure 36 ft. long, 8 ft. 6 in. wide and 8 ft. high, all inside measurements. The stock cars will weigh 31,500 lbs., and measure 36 ft. 6 in. long, 8 ft. 10¾ in. wide and 7 ft. 7 in. high, all inside measurements. The furniture cars will measure 50 ft. long, 8 ft. 9⅜ in. wide and 9 ft. 4½ in. high, all inside measurements. Twenty of the cabooses will weigh 35,800 lbs., and measure 33 ft. long, 8 ft. 4⅛ in. wide and 7 ft. 1¾ in. high, all inside measurements. The other six cabooses will weigh 18,000 lbs., and measure 15 ft. long, 8 ft. 4⅛ in. wide and 7 ft. 1¾ in. high, all inside measurements. The special equipment for all includes: Cast-iron brake-shoes; Westinghouse air-brakes; Tower couplers; National Malleable Castings Co.'s door fastenings on stock cars and Security door fastenings on furniture cars, stock cars and cabooses, and Miner draft rigging on furniture cars; McCord journal boxes and lids; Railway Steel Spring Co.'s springs and Barber trucks on box, stock and furniture cars; and Standard Car Co.'s trucks on cabooses.

BRIDGE BUILDING.

ALLENTOWN, PA.—The Lehigh Valley, the Jersey Central and the Lehigh Valley Traction Co., and the county officers are considering the amount each is to pay toward building the bridge at Allen street connecting the Sixth and Tenth wards.

ANGLAIZE COUNTY, OHIO.—Sealed bids will be received until March 2 for $10,000 bridge bonds bearing 5 per cent. interest and maturing within 10 years.

ATLANTIC CITY, N. J.—Bids will be called for building the two bridges in Atlantic City as soon as approved by the War Department. Address the Bridge Committee of the Board of Freeholders.

BAYOU, KY.—Geo. W. Landram, County Clerk, Smithland, Ky., writes that the County Court will meet on the first Tuesday in April and will probably authorize two bridges over Bayou Creek. The lengths will be 75 ft. to 100 ft. Thomas Evans, County Judge, Smithland.

BELLAIRE, OHIO.—The Baltimore & Ohio, it has been frequently reported, will build a viaduct to connect the Cleveland, Lorain & Wheeling with the main line. The structure will be over 2,000 ft. long, of steel on masonry, and accommodate two tracks. For some time the B. & O. has been preparing to rebuild two spans of the bridge over the Ohio at this place.

BILTMORE, N. C.—The Southern Ry., it is said, is considering building a new bridge over Swannonoa River near Biltmore.

BIRMINGHAM, ALA.—The Board of Revenue has ordered three steel bridges built and contracts will be let soon.

BUFFALO, N. Y.—Another bill has been introduced in the State Legislature for the proposed bridge over Grand Island to Buffalo.

CEDAR RAPIDS, IOWA.—The Cedar Rapids, Iowa & Southern (electric) Ry. will require about 38,000 lineal feet of piling, 750,000 feet of timber and 40,000 lbs. of bridge hardware for miscellaneous bridge work. There will also be three river bridges, one across Cedar River at Cedar Rapids, one across Iowa River at Iowa City, and one across Iowa River at Curtis. These bridges will require four 150-ft. spans and four 125-ft. spans. The work will be contracted for soon. J. D. Wardle, Chief Engineer, Cedar Rapids.

CLARKSBURG, W. VA.—The Clarksburg Industrial Co. has ordered a committee, consisting of Anthony Bowen, B. F. Robinson and B. B. Stout, to get bids on a bridge to be built from the extension of Main street across Elk Creek to the company's property. The cost will be about $30,000.

CLAY CENTER, NEB.—Bids are wanted until noon of Feb. 17 for building any and all bridges required in Clay County during the year 1903. W. W. Campbell, County Clerk.

COLUMBUS, OHIO.—Julian Griggs, City Engineer, writes that nothing has been decided in regard to removing the grade crossings at West Broad, West Mound and South High streets. Another conference of city and railroad officers is to be held Feb. 25.

DULUTH, MINN.—Regarding the report that the Duluth & Iron Range contemplates building a bridge at Duluth, we are told that the matter depends upon the action of the Legislature in making an appropriation. The plans are made. R. Angst, Chief Engineer, says it is doubtful whether work can be authorized this year.

FREDERICTON, N. B.—Bids will be received by the Chief Commissioner of Public Works, Fredericton, N. B., to Feb. 23 for masonry substructure, and covered Howe truss superstructure for Porter Cove bridge over the Miramichi River; to March 2, for rebuilding Harvey bridge, Durham; for rebuilding Reid's bridge, Colborne.

EXCELSIOR, MINN.—Regarding the report that the Minneapolis & St. Louis will bridge the bay at Excelsior, we are told that nothing has yet been authorized.

GALENA, MO.—The Missouri Pacific, we are told, will build two bridges in Stone County this year.

JASPER, ARK.—Newton County has decided to build a bridge at a point 20 miles from the railroad station, but has not yet accepted plans. Address the County Judge at Jasper.

KIRKSVILLE, MO.—We are told that some 20 steel bridges, all within 10 miles of the railroad, are to be built by Adair County over different streams. The lengths vary from 20-ft. to 40-ft. span, and the bids will be wanted the first week in March by Tyler Paine, County Road and Bridge Commissioner.

KIRWIN, KAN.—Bids are wanted March 10 by the County Commissioners of either Smith or Phillips County for building a steel bridge over Solomon River three miles east of Kirwin. It is to be 100 ft. long, not including approaches.

LAKE CHARLES, LA.—Bids are wanted March 3 by Leon Chavareus, Police Juror, for a steel and wooden bridge over English Bayou, to be about 1,000 ft. long. John W. Rhorer, Parish Surveyor.

LEWISTON, WIS.—The town of Lewiston will build a steel bridge across the Big Slough, eight miles northeast of Portage. The cost will be about $5,000.

LINTON, N. DAK.—A combination bridge is to be built over Sand Creek and another over Long Lake. The cost will be about $1,000 each. Address G. A. Herolz, County Auditor.

MECHANICSVILLE, N. Y.—A bill is in the Legislature providing for a bridge over Champlain Canal between Burke avenue and Francis street.

MIDDLETOWN, PA.—The plans for the Catharine street subway have been changed and the estimated cost is now placed at $10,000.

MORGAN, TEX.—The Southern Pacific contemplates building a bridge over Berwick Bay.

NEW YORK, N. Y.—New bids are wanted Feb. 18 by the Aqueduct Commissioners, 280 Broadway, for building the 14 highway bridges over Croton Lake and its tributaries.

NILES, OHIO.—Bids are wanted Feb. 15 for the stone work on a steel bridge over Mosquito Creek. Further information can be had from the Commissioners at Warren.

NILES, MICH.—The Bertrand bridge across the St. Joseph River near Niles has been swept away by a freshet. It was 1,500 ft. long.

OKLAHOMA CITY, OKLA. TER.—Local reports state that there is a probability of a viaduct being built over the Choctaw right of way. The Mayor can probably give information. The cost will be about $10,000.

OTTAWA, ONT.—Carleton County Council will erect a steel and concrete bridge over the Jock River, at Marlborough. J. B. Lewis, Ottawa, Ont., is engineer.

PEORIA, ILL.—All bids received for the construction of new steel bridge across Farm Creek, on east side of the river, were rejected Jan. 27. The City Clerk was instructed to advertise for new bids, each contractor to furnish his own plans and specifications.

PHILADELPHIA, PA.—The Government Engineer in charge in this district is reported to have approved the plans of the bridge to be built over the Schuylkill by the Philadelphia Rapid Transit Co. It will be located between the Pennsylvania R. R. bridge and the Market street bridge. Local reports state that bids will be wanted for building the piers immediately after the plans are approved by the Secretary of War, W. S. Twining, Chief Engineer.

PHOENIX, ARIZ.—The Phœnix & Eastern will require two or three steel bridges, two of which will cross the Salt and Gila rivers. One will be 900 ft. long. W. A. Drake, Prescott, is Chief Engineer.

PITTSBURGH, PA.—Director McCandless, of the Bureau of Bridges, estimates that about $50,000 will be used in repairing bridges during 1903.

READING, PA.—The Highway Committee of the Councils has approved plans for the new $40,000 bridge to be built jointly by the Philadelphia & Reading, the city and the United Traction Co., over the Reading tracks at Front street.

The Board of Trade has again taken up the question of a bridge over the Schuylkill at Sixth street.

REDDING, CAL.—The Board of Supervisors wants bids March 4 for building the bridge over Pitt River at Peck's Ferry. The bridge will consist of five 40-ft. spans, two 30-ft. spans and two 24-ft. spans.

SALEM, MASS.—The Commissioners of Essex County have given permission to the Boston & Maine to put a bridge over its tracks at Castle Hill. It will be a 60-ft. span, 30 ft. wide.

SAN FRANCISCO, CAL.—The Southern Pacific is reported to have made a proposition to the City Engineer for a viaduct on Third street instead of Fifth street, to cost about $125,000, the railroad to pay $55,000.

SAVANNAH, TENN.—Hardin County will build four steel bridges in 1903, and let the contracts on April 6, but bids must be in before March 2. The total cost will not exceed $10,000. The bridges are to cross Horse, Turkey and Indian creeks. A. A. Watson may be addressed.

SYRACUSE, N. Y.—A bill has been introduced in the Legislature to have the State appropriate $10,000, or half the cost of a new bridge over the canal at Crouse avenue.

TULSA, IND. TER.—The War Department has granted permission to the Missouri, Kansas & Oklahoma to bridge the Arkansas River at Tulsa, at a point about 30 miles above the St. Louis & San Francisco bridge, where the river is not navigable.

WARWICK, DEL.—A $15,000 drawbridge is proposed over Indian River.

WASHINGTON, D. C.—Bids are wanted March 27, addressed to Col. Chas. J. Allen, Corps of Engineers, Washington, D. C., for building the highway bridge across the Potomac River, replacing the old Long Bridge. The bridge will be a steel truss of 11 fixed spans of 216 ft. each, and one draw span 290 ft. long, and 12 piers and two abutments of granite and concrete masonry, all on pile foundations. The bridge will have a 40-ft. roadway and two sidewalks, each 8 ft. wide.

WHEELING, W. VA.—A bridge is proposed over the creek at Elm Grove, to reach the plant of the Wheeling Mold, Heating, Ventilating & Foundry Co. The cost will probably be $10,000.

WICHITA, KAN.—The Board of County Commissioners, at its meeting March 1, will consider propositions for building three bridges, two of which will probably be steel structures.

Other Structures.

CADILLAC, MICH.—It is said that plans for a new station of the Ann Arbor road are ready.

CINCINNATI, OHIO.—The Baltimore & Ohio Southwestern proposes to build a new freight house about 1,200 ft. long on Second street. The Cincinnati Southern will build new terminals on Water and Front streets. The Louisville & Nashville also has in view a number of improvements.

DETROIT, MICH.—An officer of the Detroit United Ry. is reported as saying that it is possible that the company will build its own cars hereafter.

INDIANAPOLIS, IND.—A. L. Jacobs, said to be of Cleveland, Ohio, is negotiating with the Commercial Club, of Indianapolis, in regard to organizing a car building company to operate in Indianapolis. Geo. E. Hunt, Secretary of the Club, may be able to give further information.

JERSEY CITY, N. J.—Fire has destroyed a power house of the Pennsylvania R. R. in Jersey City. It is said the loss will be over $70,000.

KANSAS CITY, MO.—Mr. B. L. Winchell, President of the Board of Directors of the Union Depot Co., is reported as saying that as soon as representatives of the railroads interested in the proposed new station can agree upon a site, the plans for the structure will be made public.

KEOKUK, IOWA.—O. A. Talbot & Co., of Osceola, Iowa, propose to build a large elevator in Keokuk.

KNOXVILLE, TENN.—The new passenger station of the Southern Ry. in Knoxville was opened on the morning of Feb. 2. It is of white marble and was designed by Mr. Frank P. Milburn.

LOUISVILLE, KY.—The contract for the steel for the 10 new shop buildings to be built by the Louisville & Nashville in South Louisville has been let to the American Bridge Co. The work will require about 5,500 tons of steel.

MONTREAL, QUE.—The Montreal Rolling Mills Co. will enlarge its mill on Notre Dame street.

OKLAHOMA CITY, OKLA. T.—The contract for building the Missouri, Kansas & Oklahoma freight station in this city, to cost $15,000, has been let. The contracts for the

passenger station, tanks and roundhouse are yet to be let. Superintendent Trice, of the Santa Fe, is reported as stating that a new passenger station to be built by that road in Oklahoma City will cost $100,000, and that work is to be begun this month.

PARKERSBURG, W. VA.—Several new plants have recently located here, the largest of which is the Parkersburg Iron & Steel Co. The others are the Monarch Iron & Steel Co., the United States Engine Works, the Budke Iron Co.

PITTSBURGH, PA.—The Monessen Furnace Co., affiliated with the Pittsburgh Steel Co., it is said, is about ready to get bids on its new furnaces to be built adjoining the steel works at Monessen.

The contract for the passenger station in Pittsburgh for the Wabash will be let at once, now that the city has passed the ordinance. The structure was described and illustrated in the *Railroad Gazette*, Nov. 7, 1902.

ST. JOHN, N. B.—The contract for building the $80,000 roundhouse for the Intercolonial Ry. at St. John has been let to Messrs. Flood & Bates.

SEATTLE, WASH.—The Great Northern and Northern Pacific, it is understood, intend to build a large union station in Seattle.

TORONTO, ONT.—A. Angstrom has been appointed General Manager of the new Canadian Ship Building Co., which is now negotiating for land as the site for its ship building works.

TORONTO JUNCTION, ONT.—The Canadian Pacific will build a new station at Weston Road and Dundas street.

WAYCROSS, GA.—Local reports state that at present there are two concerns building cars in that city, and there is a project under consideration to build another plant, with a capacity of 10 cars a day. Geo. D. Wadley is interested.

WILMINGTON, DEL.—The Philadelphia, Baltimore & Washington is getting ready to build its new passenger station in Wilmington. The present station will be torn down.

MEETINGS AND ANNOUNCEMENTS.

(For dates of conventions and regular meetings of railroad associations and engineering societies see advertising page xvi.)

Western Railway Club.

At the February meeting, to be held on Tuesday, the 17th inst., there will be two subjects for discussion. The first of these is "The Chicago & North Western Railway Co.'s Method of Purifying Water for Locomotive Boilers," by Mr. Geo. M. Davidson, Chemist and Engineer of Tests, C. & N. W. Ry., Chicago. The subject will be treated as a lecture and no advance copies of the paper have been sent out. The second subject is "Paint," by Mr. Houston Lowe, Vice-President, Lowe Bros. Co., Dayton, Ohio.

Car Foremen's Association of Chicago.

At the regular meeting of the Car Foremen's Association of Chicago, held Feb. 11, at 8 o'clock p. m., the following was the programme: 1. Rule 91 reads, "Air hose applied, $2.00." When hose is missing on defect card what is the proper charge for labor and material? When is the labor charge of three cents, referred to in Rule 109, to be made? 2. At what rate should labor be charged on steel cars? 3. Should a switching road be held responsible for damage done to a car by load shifting? 4. Discussion of M. C. B. rules.

PERSONAL.

—Mr. Samuel W. Torrey, of East Orange, N. J., who was one of the builders of the New Jersey Southern Railroad, died at his home on Feb. 6, at the age of 80.

—Dr. J. F. Valentine, Surgeon of the Long Island Railroad, died Feb. 5, at his home on Church street, Richmond Hill, Brooklyn, N. Y. Dr. Valentine was 45 years old.

—The new General Superintendent of the Ohio Division of the Erie Railroad, Mr. J. C. Stuart, was until lately connected with the Baltimore & Ohio Railroad. A brief sketch with portrait appeared in this column at the time of Mr. Stuart's appointment as General Superintendent of Transportation of the latter company, and will be found in the issue of Jan. 3, 1902, page 13.

—Mr. V. P. Safford, the new Manager of the Mexican Northern, was born in 1857. He entered railroad service in 1876 as an Assistant Engineer on the Dayton & Southeastern, and, until 1890, was continuously engaged in railroad engineering on various roads. In June, 1890, he was appointed Chief Engineer of the Mexican Northern and on the completion of this road was made its Superintendent, from which position he has just been promoted.

—The new Assistant to General Superintendent Marshall, of the Lake Shore & Michigan Southern, Mr. F. Wilson, is 30 years old, and has been in the service of the Cleveland, Cincinnati, Chicago & St. Louis since September, 1887, starting as a clerk. In 1894 he was private secretary to General Superintendent Van Winkle, and four years later was made chief clerk, then he became Trainmaster and later Assistant to the General Superintendent.

—On Feb. 1, Mr. W. J. Jackson became General Superintendent of the Chicago & Eastern Illinois. Mr. Jackson was born in Toronto, Canada, and began his railroad service in that city as a machinist's helper in the shops of the Grand Trunk Railway. He later went into the freight department, and in 1891 resigned, as assistant local agent at Chicago, to take a similar position with the Chicago & Eastern Illinois. In July, 1899, he was appointed Assistant General Superintendent, which position he has held until now.

—Mr. W. H. Newell, whose promotion from Assistant Superintendent of Transportation to Superintendent of the Atlantic Coast Line, was recently announced, was born May 16, 1857, and began his railroad service in 1877 as a telegraph operator for the Wilmington & Weldon. Mr. Newell's entire service has been with the Atlantic Coast Line, rising through the various grades until November, 1898, when he was appointed Assistant Superintendent of Transportation of the Norfolk District. He assumed his new duties on January 1 last.

—The new Superintendent of Motive Power of the Baltimore & Ohio Southwestern, Mr. J. G. Neuffer, is 49 years old and was born at Chillicothe, Ohio. He entered railroad service as machinist apprentice on the Marietta & Cincinnati in 1869, and subsequently became machinist, fireman and shop foreman. In March, 1890, he was appointed road foreman of the Baltimore & Ohio Southwestern and continued in this position until May, 1892, when he was made Master Mechanic. In December the next year he became General Master Mechanic, which position is now abolished, Mr. Neuffer becoming Superintendent of Motive Power.

—Mr. Ernest J. Cleave, Superintendent of the Pennsylvania Railroad, at Cresson, Pa., was born at Philadelphia in 1864. His railroad service dates from 1881, when he began as a rodman on the Pittsburgh & Western. In April the following year Mr. Cleave took a similar position in the Principal Assistant Engineer's office of the Pennsylvania Railroad and remained there about two years, when he became Assistant Engineer. He was Assistant Supervisor until 1889, when he became Supervisor at Phillipsburg. In August, 1900, Mr. Cleave became Assistant to the Principal Assistant Engineer at Altoona, and the following December assumed the duties of Principal Assistant Engineer, which position he held until his new appointment as above.

—Mr. S. J. Collins, the successor to Mr. J. H. Sands as General Superintendent of the Eastern District of the Southern Railway, began his railroad career with the Chicago, Milwaukee & St. Paul as a telegraph operator and served successively as operator, train despatcher, Assistant Division Superintendent and Division Superintendent until 1890. In July, 1891, he was appointed General Superintendent of the Louisville, New Albany & Chicago, and he went from that road to the Wisconsin Central as General Superintendent. He retained this position until November, 1901. After leaving this company he was for a time engaged in special work in the operating department of the Canadian Pacific. Mr. Collins will be located at Salisbury, N. C.

—Mr. S. M. Manifold, General Superintendent of the Western Maryland Railroad, was born in York County, Pa., in 1842. Mr. Manifold served during the civil war and rose to the rank of First Lieutenant. His railroad service began in 1872, and for four years he was employed in different capacities on the Peach Bottom Railway. From October, 1876, to 1881 he was Superintendent and Chief Engineer, and during 1881 and 1882 was manager for the Receiver of the same road. Then for a number of years he was Superintendent, General Freight Agent and Purchasing Agent of the York & Peach Bottom, but resigned to go with the Baltimore & Lehigh. In April, 1892, he went to the Pennsylvania Railroad, and then in 1893 and 1894 was Manager for the Receiver of the Baltimore & Lehigh. The next five years he spent on the York Southern as General Manager, Chief Engineer, Purchasing Agent and General Freight and Passenger Agent. From August, 1899, up to his recent appointment Mr. Manifold was Superintendent of the Baltimore & Harrisburg, the Second Division of the Western Maryland.

ELECTIONS AND APPOINTMENTS.

Albany & Hudson.—M. E. Stark, Superintendent and General Freight and Passenger Agent, with headquarters at Albany, N. Y., has resigned.

Baltimore & Ohio.—The position of Master Mechanic of the Ohio Division has been created and J. Billingham has been appointed to the new position, with headquarters at Parkersburg, W. Va. T. E. Lewis has been appointed to succeed Mr. Billingham as Master Mechanic, with headquarters at Cumberland, Md.

Canadian Northern.—W. A. Brown has been appointed Superintendent, with headquarters at Winnipeg, succeeding J. T. Arundel. A. Shields has been appointed Master Mechanic, succeeding C. Raitt. Mr. Shields will also be located at Winnipeg. H. W. Brodie has been appointed Assistant General Passenger Agent, with headquarters at Winnipeg.

Canadian Pacific.—See Quebec Southern.

Central of New Jersey.—A. Detro has been appointed Master Mechanic, with headquarters at Mauch Chunk, Pa.

Chicago Great Western.—C. C. Edwards has been appointed Acting Master Mechanic, with headquarters at Red Wing, Minn., succeeding George Gregory, resigned.

El Paso-Northeastern.—A. S. Greig has been appointed General Manager, and E. J. Dedman, heretofore Purchasing Agent, has been appointed to succeed Mr. Greig as Assistant General Manager, with headquarters at Alamogordo, N. Mex.

Erie.—H. B. Crandall, Coal, Freight and Fuel Agent, with headquarters at New York City, has resigned.

Duluth, Missabe & Northern.—W. A. McGonigle, heretofore Assistant to the President, has been appointed Vice-President and his former position has been abolished.

Houston East & West Texas.—The Directors of this company are: C. H. Markham, Jeff N. Miller, James A. Baker, W. W. Cleveland, Howard F. Smith, C. C. Pillott, W. F. Carter, all of Houston, and James A. Blair, of New York.

Kansas City Southern.—H. A. Weaver has been appointed Assistant General Freight Agent, with headquarters at Kansas City, Mo., succeeding W. C. Dennis. J. W. Metcalf, heretofore Trainmaster, has been appointed Superintendent, with headquarters at Pittsburgh, Kan., succeeding W. Coughlin.

Lake Erie, Alliance & Wheeling.—The jurisdiction of the following officers of the Lake Shore & Michigan Southern has been extended over the L. E., A. & W.: W. H. Newman, President; W. C. Brown, Vice-President; W. H. Marshall, General Superintendent; G. J. Grammer, General Traffic Manager; E. A. Handy, Chief Engineer; George C. Greene, General Consul; F. J. Jerome, General Attorney; R. H. Hill, Auditor; F. H. Greene, Purchasing Agent, and J. F. Deems, General Superintendent of Motive Power, Rolling Stock and Machinery. (See Jan. 30, p. 92.)

R. H. Hill has been appointed Auditor, with headquarters at Alliance, Ohio, succeeding the late F. B. Everett.

Lehigh Valley—J. Shirley Eaton, Statistician, with headquarters at New York City, has resigned.

Michigan State R. R. Commission.—D. H. Clark has been appointed Deputy Commissioner, succeeding Charles H. Chapman.

Minneapolis, St. Paul & Sault Ste. Marie.—W. L. Martin, heretofore General Freight Agent, has been appointed Freight Traffic Manager.

Missouri Pacific.—R. M. McDowell, Fuel Agent, with headquarters at St. Louis, Mo., has resigned.

New York Central & Hudson River.—A. T. Hardin, heretofore Engineer of Track, has been appointed Engineer of Maintenance of Way, in charge of track, bridges, buildings and signals, effective Feb. 2. He will be located at New York City and will report to the General Superintendent.

Norfolk & Western.—Charles C. Wentworth has been appointed Principal Assistant Engineer. Frank C. Lewis has been appointed Bridge Engineer, succeeding Mr. Wentworth, effective Feb. 16.

Northern Pacific.—A. Beamer has been appointed Division Superintendent, with headquarters at Spokane, Wash., succeeding F. W. Gilbert, transferred.

Pennsylvania.—Owing to ill health F. F. Robb, Superintendent at Allegheny, Pa., has been granted an indefinite leave of absence. A. J. Whitney, Jr., Assistant Engineer, will act as Superintendent during Mr. Robb's absence.

Quebec Southern.—A. H. Harris, General Traffic Manager, with headquarters at Montreal, Que., has resigned to take a position in the general traffic department of the Canadian Pacific.

Reading Company.—H. McK. Twombly has been elected a Director, succeeding A. J. Antelo, deceased.

St. Louis & Gulf.—See St. Louis, Memphis & Southeastern.

St. Louis & San Francisco.—H. H. Porter, W. K. Bixby, J. S. Ford and J. T. Fulton have been elected Directors, succeeding I. N. Seligman, F. Strauss, G. A. Madill and Richard Olney, resigned.

St. Louis, Memphis & Southeastern.—The jurisdiction of E. F. Blomeyer, General Freight and Passenger Agent, has been extended over the St. Louis & Gulf. W. R. Powe, General Freight and Passenger Agent of the St. Louis & Gulf, has been appointed Assistant General Freight and Passenger Agent of the St. L., M. & S. E., with headquarters at Cape Girardeau, Mo.

Southern.—J. B. Michael, heretofore Master Mechanic at Knoxville, has been appointed Assistant Mechanical Superintendent, with headquarters at Washington, D. C.

Western Maryland.—J. Ramsey, Jr. (President of the Wabash), has been elected President of the W. M., and the West Virginia Central & Pittsburgh.

The jurisdiction of B. H. Griswold, General Traffic Manager; Robert Casson, General Auditor; L. F. Zimmerman, Secretary; J. T. M. Barnes, Assistant Secretary and Treasurer, and H. B. Henson, Comptroller, has been extended over the West Virginia Central & Pittsburgh.

West Virginia Central & Pittsburgh.—See Western Maryland.

Wiggins Ferry Company.—The officers of this company are: President and General Manager, W. K. Kavanaugh; Vice-President, Robert Mather (Second Vice-President of the Rock Island); Treasurer, C. L. Gilbert; Secretary, M. F. Wates, and Assistant Secretary, W. F. Morse. (See Jan. 16, p. 56.)

RAILROAD CONSTRUCTION.

New Incorporations, Surveys, Etc.

ADAMS COUNTY ELECTRIC TRANSIT (WASHINGTON).—The proposed route of this new electric line in the State of Washington is from Washtucna to Ritzville, and thence northwest to Odesso and Wilbur, a total of about 90 miles. Rights of way have been secured, and surveys are now in progress. C. W. Davis is Chief Engineer, and P. R. Clark, Secretary, both of Ritzville, Wash. This road was mentioned in our issue of Jan. 16, 1903, under the heading of Washtucna & Odesso. (Official.)

ASHLAND & WOOSTER.—See Railroad News.

AUGUSTA & COLUMBIA.—This company has filed articles of incorporation to build from Aiken northeast to Columbia, S. C. J. U. Jackson, Augusta, Ga., is President.

BEAUMONT, SOUR LAKE & HOUSTON (ELECTRIC).—The contract for this line between Beaumont and Sour Lake, Texas, nine miles, has been let to Kelly Bros., of St. Louis. The road, when completed, will carry both freight and passengers. (Nov. 14, 1902, p. 881.)

BROCKVILLE & NORTHWESTERN.—The New York syndicate which has recently acquired this road, formerly the Brockville, Westport & Sault Ste. Marie, has made application to the Dominion Parliament for power to extend the line from Westport to Sault Ste. Marie, Ont., with branches to Barry's Bay, North Bay and Parry Sound.

CANEY RIVER.—This company has recently been incorporated to build from Bald Mountain to a point in Mitchell, Madison or Yancey County. J. M. Puck and W. H. Wood, of Johnson City, Tenn., are interested. Preliminary surveys are now in progress.

CEDAR RAPIDS, IOWA CITY & SOUTHERN.—This new interurban electric road from Cedar Rapids to Iowa City, 30 miles, will pass through Curtis, North Liberty and Coralville. Contracts for grading will be let about March 1. There will be three bridges. J. D. Warelle, Cedar Rapids, Iowa, is Chief Engineer.

CENTRAL CITY, YANKEE HILL & JAMES PEAK.—It is reported that a narrow gage road 15 miles long will be built from Central City to the Yankee Hill mining district, Colorado, along the Fall River canyon. R. A. Hall, of Cedar Rapids, Iowa, is interested. This road was mentioned as projected in our issue of Dec. 19, 1902, p. 972, under the head of Yankee Hill & Alice.

CHICAGO & NORTH WESTERN.—The contract has been let for building the third track between DeKalb and Cortland, Ill., a distance of five miles.

CHICAGO GREAT WESTERN.—An officer writes that the line which this company is building from Fort Dodge westward to Council Bluffs, 132 miles, has been entirely graded. Track has been laid between Fort Dodge and Manning, 69 miles. The viaduct over the Des Moines River at Fort Dodge is practically completed. The rebuilding of the old Mason City & Fort Dodge line between Clarion and Hampton is also about finished.

CHICAGO, MILWAUKEE & ST. PAUL.—An officer writes that the new line from Eureka to Linton, 49 miles, has been completed as far as Strasburg, 39 miles. D. Grant & Co., of Faribault, Minn., are the contractors. Grading on the extension from Muscatine, Iowa, to Rutledge, a distance of 76 miles, is practically completed and track has been laid as far as the Iowa River, 20 miles from Muscatine. McIntosh Bros., Milwaukee, and Flick &

Johnson Construction Co., Davenport, Iowa, are the contractors.

Chicago, Terre Haute & Southeastern.—Articles of incorporation have been filed by this company in Illinois. The proposed route is from Chicago south through Lake, Newton, Benton, Warren and other counties, to Terre Haute, Ind. Niles Olsen, Bayard Taylor and C. H. Gazer, all of Chicago, are interested.

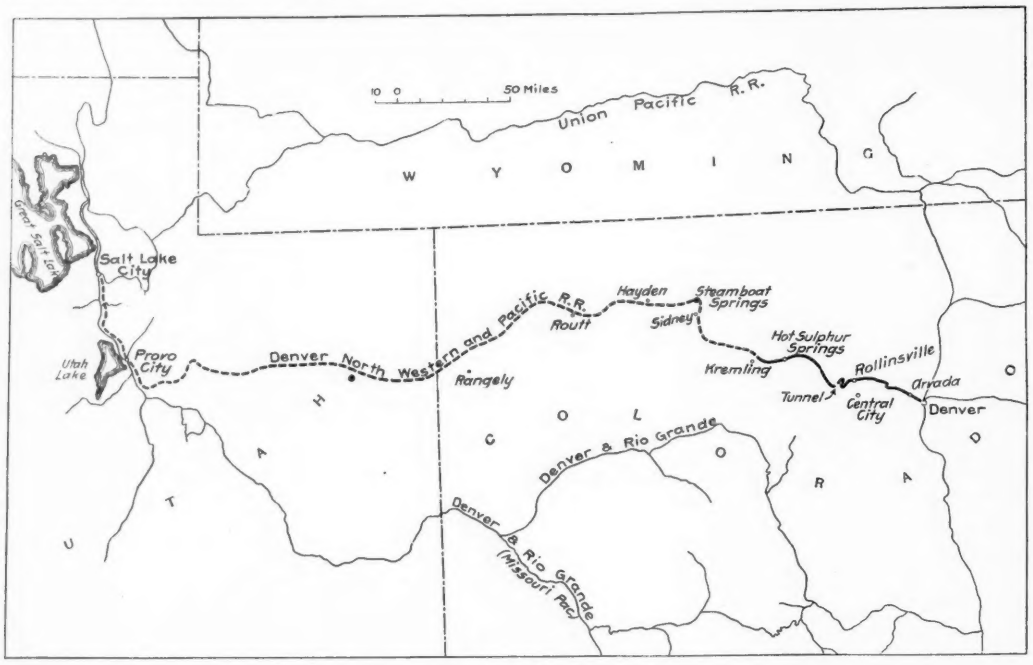
Cincinnati & Louisville.—Press reports state that this road will build from Cincinnati southwest to Madison, Ind., and from there to Jeffersonville. W. A. Bradford, Jr., of Boston, and Henry C. Starr, of Cincinnati, are interested. (Nov. 28, 1902, p. 917.)

Columbia River & Northern.—An officer writes that grading has been completed on this line, which runs from Lyle, Wash., northeast via Soda Springs, Daly and Centerville to Goldendale, a distance of 43 miles. A. L. Anderson and Corey Bros. are the contractors. Track has been laid for a distance of nine miles out of Lyle. An extension from Goldendale to the mouth of Rock Creek, 30 miles, has been partially surveyed. (Jan. 2, p. 18.)

Columbus Belt & Terminal.—Articles of incorporation have been filed by this company to build from Worthington, via Hilliard, Alton, Galloway, Grove City and Central Village to Columbus, Ohio. A. E. Boone, S. A. Baldwin and J. H. Coke, Columbus, Ohio, are interested.

Cuban Eastern.—This company was incorporated on Feb. 6, in New Jersey, with a capital stock of $2,000,000. It will build and operate railroads in Cuba. L. N. Wheaton and F. B. Mearkles are interested.

Denver, Northwestern & Pacific.—The proposed route of this new road is from Denver to Salt Lake City. The line, as surveyed, starts at Denver and goes through the Continental Divide tunnel, Fraser River valley, Muddy Creek valley, across the Gore range to the Yampa River valley near Steamboat Springs through the upper valley of Strawberry Creek to the summit of the Wahsatch range in Utah, where it descends to the Great Salt Lake valley. This is a total of 500 miles, of which 125 is mountain and 375 valley mileage. The grades on the mountain section will not exceed 2.5 per cent. and the curvature will be limited to a maximum of 12 deg. On the valley portions light grades will prevail and the curvature will not exceed 6 deg. The tunnel through the Continental Divide will be 11,800 ft. long and will be cut through solid granite at an elevation of 10,100 ft. above sea level. The accompanying map shows the line of the Denver, Northwestern & Pacific as projected, and also the existing routes of the Union Pacific and the Denver & Rio Grande between the same points. The new line will be approximately 128 miles shorter than the Union Pacific, and 240 miles shorter than the Denver & Rio Grande.



Denver Northwestern & Pacific.

Eastern Arkansas.—This company has been incorporated to build from Helena, Ark., north along Crowley's Ridge to the southern bank of the L'Anguille River, and thence across the river to a point between Big Lake and Crowley's Ridge, on the border of Missouri. G. T. Updegraff is President, and J. B. Pillow, Vice-President. The company's main office is at Helena, Ark.

Erie & Conneaut Traction.—Contract for this new electric line from Erie to Conneaut Junction, Pa., has been let to W. McLean & Co. The greater part of the grading has been completed and track laying will begin as soon as the weather permits.

Indianapolis & Cincinnati Traction.—This company has been incorporated in Indiana to build from Cincinnati to Indianapolis. The line will be built at once to Rushville, 40 miles, and will pass through New Palestine, Morristown, Liberty and Harrison. C. L. Henry is President; Ephraim Marsh, of Greenfield, Vice-President.

Indianapolis Southern.—At a recent meeting of the stockholders of this company it was decided to build two extensions from Bloomington to Stanford, Ind., 10 miles, and also a branch to Sullivan, passing through Green County, a distance of about 50 miles.

Joliet, Wilmington & Dwight.—This company has been incorporated in Illinois, to build from Joliet south to Dwight, 40 miles, with a branch to South Wilmington. F. E. Fisher and L. H. Mottinger, of Joliet, and H. A. Fisher, of Columbus, Ohio, are incorporators.

Jonesboro, Lake City & Eastern.—Work is reported in progress on the extension of this road from Blytheville southeast to Barfield. M. E. Brooks, Jonesboro, Ark., is the engineer in charge. The line now extends from Big Lake east to Blytheville, Ark., 16 miles. (July 18, 1902, p. 579.)

Kansas City, Mexico & Orient.—An officer denies that this company is about to build an extension from Barton, Okla. T., through Hobart and Cooperstown to Lawton. (Jan. 23, p. 74.)

Kennebec Valley.—Incorporation is being asked for this company from the Maine Legislature, with power to buy or lease the Somerset Railroad, which extends from Oakland north to Bingham, Me., 41 miles. An extension from Bingham north to Moosehead Lake is asked. This would give a through line from Waterville, on the Kennebec River, to a connection with the Canadian Pacific on the west shore of Moosehead Lake. W. M. Ayer and A. R. Small, of Oakland, Me., and W. T. Haines, of Waterville, are interested.

Maine Midland.—Incorporation is being asked from the Maine Legislature for a company by the above name with power to build from Farmington Falls through Chesterville, Fayette and East Livermore to a connection with the Portland & Rumford Falls. The company also purposes the buying or leasing of the Wiscasset, Waterville & Farmington. E. P. Borden, of Philadelphia; Edmund Eaton, of Livermore Falls; H. P. Prescott, of New Sharon, Me., and others are interested.

Maryland & Pennsylvania.—Press reports state that this company will build a branch from Conowingo, Cecil County, northeast to Bynum, Md., a distance of 10 miles. T. H. Ward is Chief Engineer, and J. S. Morris, Baltimore, Md., General Manager.

Metropolitan Street (New York).—The horse-car crosstown lines on Grand street, Fourteenth street and Eighty-sixth street are to be changed to underground electric.

Mexican Roads.—The Mexican Government has rescinded the concession which it granted in 1899 for the building of a line between Merida and Progreso. The concession passed into the hands of the United Railways of Yucatan at the recent merger of the roads on the Peninsula. As there are already two roads between the places named, and both are owned by this company, the Government decided the third road was not necessary.

The Mexican Government has granted an extension of six months to A. W. Lilliendahl, of Saltillo, Mexico, on his concession for the building of a road between Saltillo and Arteaga, 20 miles. Work will be begun immediately.

Michigan Shore & Eastern.—Articles of incorporation have been filed by this company to build from Bertrand Township to Kalamazoo, Mich. It is understood that this new company will take over the property of the Milwaukee, Benton Harbor & Columbus, the South Haven & Eastern and the Coloma & Paw Paw Lake Tram Ry. Edward Maher, Chicago; W. P. Squire, of Paw Paw; S. H. Kelly and J. Duff, of Berrien Harbor, are directors.

Mobile, Jackson & Kansas City.—An officer writes that contract has been let to C. D. Smith & Co., New Orleans, and to B. H. Hardaway, Columbus, Ga., to build this new line from Beaumont, Miss., via Laurel and Newton, to Decatur, 110 miles. (Dec. 5, 1902, p. 934.)

North River (Electric).—A franchise has been granted this company to build from Saratoga east to Schuylerville, N. Y., 12 miles, and also to Corinth, 14 miles, making connections with the Hudson Valley, which runs through Saratoga, Warren and Washington Counties.

Oklahoma City & Western.—An officer writes that grading on this road from Oklahoma City south to Quanah, Texas, 183 miles, has been completed. Track has been laid between Oklahoma City and Eldorado, a distance of 168 miles. Johnston Bros., St. Elmo, Ill., are the contractors. (Nov. 14, 1902, p. 882.)

Ottawa, Brockville & St. Lawrence.—The survey of this line from Richmond, through Merrickville and other towns in Carleton County, has been completed. Grading will begin shortly. E. J. Walsh, Ottawa, Ont., is interested. (Jan. 2, p. 18.)

Ottawa Valley.—Application will be made at the next session of Parliament for permission to extend this line to Montreal. J. R. Thebeaudeau, of Montreal, is President.

Pennsylvania.—Bids will be received at the office of this company until Monday, Feb. 16, for all the grading and masonry on the double track between Parkersburg, Pa., and Columbia. The contract will be let in eight sections, varying from 17,000 ft. to 25,000 ft.

Pere Marquette.—It is reported that this company will extend its line from Pentwater north to Manistee, Mich., via Ludington, a distance of 30 miles. This will make a trunk line from Manistee to New Buffalo.

Philadelphia & Langhorne Street.—Notice has been filed by this road for a proposed extension from Somerton northwest to Feasterville and Willow Grove, about 10 miles. W. B. Parry, J. L. Bronson and M. H. Ivins, of Langhorne, Pa., are interested.

Pittsburgh, Carnegie & Western (Wabash).—On Feb. 2 the Select Council of Pittsburgh passed the ordinance allowing this company to enter Pittsburgh under the agreement recently reached between the Wabash and the Pennsylvania roads. The Common Council also passed the ordinance on Feb. 3. (Jan. 16, p. 56.)

Port Angeles Pacific.—Grading is reported completed on this line from Port Angeles to Lake Crescent, Wash., a distance of 18 miles, and track laying will begin immediately. W. R. Smith, Port Angeles, Wash., is General Manager.

Rochester & Eastern Rapid Ry.—This new line is to be built from Rochester, through Canandaigua to Geneva, N. Y., 40 miles. The Comstock, Haigh & Walker Co. have the contract for building and equipping the line, which will probably be finished about July 1, 1903.

St. Louis & San Francisco.—The two new lines between O'Keene, Okla. T., and Vernon, Texas, and between Lawton and Snyder, Okla. T., have been opened for traffic. This latter extension is to be built eventually to Quanah, Texas, to a connection with the Fort Worth & Denver City.

Salt Lake & Suburban.—An officer writes that the proposed route of this road will go from Salt Lake, via Murray, Union, Taylorsville, Holliday and Mill Creek to Sandy, 40 miles. Surveys are completed and work will be begun early in the spring. Contracts for grading will be let very shortly. There is a maximum grade of 5 per cent., with one tunnel. Charles L. Furey, 171 La Salle street, Chicago, is President; A. V. Taylor, Vice-President.

Seattle, Renton & Southern.—Press reports state that this company has been organized to absorb the Seattle-Renton Ry. and to make extensive improvements on the line. J. Osgood, Seattle, Wash., is General Manager.

Texas Midland.—Surveys are reported between Ennis and Ross, Texas, a distance of 45 miles, north and south. The line now runs from Ennis to Greenville, 73½ miles, with a branch from Commerce to Paris, Texas, 37½ miles. E. H. A. Green, Terrell, Texas, is General Manager.

Trinity & Brazos Valley.—Contracts for this new line from Hillsboro, Texas, to Hubbard, 25 miles, have been let to L. M. Ridout, W. H. Weidman, J. H. Harn, Rihn & Rodgers and others. L. T. Gilbert has the section through the mountain east of Hubbard. B. Thompson, Hillsboro, is Chief Engineer. (Dec. 26, p. 992.)

Wabash.—See Pittsburgh, Carnegie & Western.

GENERAL RAILROAD NEWS.

Ashland & Wooster.—C. W. French has bought this road, which runs south from Ashland, Ohio, to Custaloga, 25 miles. It is reported that the road will be turned over to the Chicago Short Line Co. to be operated as a part of its system. Extensions from Ashland to Sandusky, and from Custaloga to the Ohio River, are projected. C. W. French is President, and A. S. Miller, of Ashland, Ohio, Vice-President.

Champaign & Southeastern.—This line has been sold at foreclosure sale to the Wabash. It runs from Sydney to Champaign, Ill., 12 miles, and has been operated for several years under a lease by the Wabash.

Chicago, Rock Island & Pacific.—This company has purchased from the Southern Pacific an interest in the Houston & Texas Central. This will give the Rock Island System a direct route to Houston and will also furnish it with an entrance into Galveston, Texas. The Houston & Texas Central controls nearly 700 miles of road, and has a capital stock of $10,000,000, which is practically all owned by the Southern Pacific.

A bill has recently been introduced in the Texas Legislature asking for permission for the Chicago, Rock Island & Pacific to purchase its Chicago, Rock Island & Mexico and Choctaw, Oklahoma & Gulf branches.

Kansas City, Outer Belt & Electric.—The United States & Mexican Trust Co., of New York City, are offering at par, with a bonus of 100 per cent. in common and preferred stock, $1,500,000 of the $3,000,000 bond issue of this company's first mortgage 4 per cent. 50-year $1,000 gold bonds, dated Jan. 1, 1903. The company was organized in the interest of the Kansas City, Mexico & Orient, to build a belt line in Kansas City, and to erect terminals for the relief of congestion of traffic. The proceeds from the sale of these bonds are to be used to build the above line, and also to build a bridge over the Missouri River. The company is managed by a voting trust, of which A. E. Stilwell, president of the Kansas City, Mexico & Orient, is a member.

Louisville & Nashville.—This company announces that on April 1 it will redeem at par $7,500,000 collateral 4 per cent. gold bonds, dated 1898.

Louisville Ry.—Negotiations are now pending for the merger of this company with the Louisville Gas, Louisville Electric Light and Citizens' General Electric Co. No official information with regard to this consolidation has yet been given out.

Norfolk & Western.—Gross earnings for this road during the last six months of 1902 were $10,038,665, as against $8,672,150 in the same months of 1901, an increase of $1,366,515. The expenses during the latter half of 1902 were $5,979,267, an increase of $1,046,409 over 1901; leaving net earnings $4,059,397, an increase of $320,024.

Northern Pacific.—The regular quarterly dividend of 1½ per cent. has been declared by this company, and also an extra dividend of ½ per cent.

Nova Scotia Central.—Press reports state that this road, which runs from Middleton to Lunenburg, 74 miles, has been sold to Mackenzie & Mann, but no official information with regard to the sale has as yet been made.

Pennsylvania.—The *Commercial and Financial Chronicle* states that the holders of the $50,000,000 of 3½ per cent. 10-year convertible gold bonds are offered the privilege to convert the same into capital stock at $70 per $50 share, between March 6 and April 4. The bonds may be deposited with the Treasurer at the Broad Street Station, Philadelphia, or at 85 Cedar street, New York. Receipts will be issued exchangeable for certificates of stock bearing date May 9, 1903. Due notice will be given when the certificates are ready for delivery. The bonds must carry all coupons except the one due May 1, 1903.

Xico & San Rafael.—Press reports state that this road has been sold to an American syndicate. It is 70 miles long and runs between the above-named points in Mexico. An extension to Pueblo is projected.